



FrameMax Cold Formed Steel Framing System

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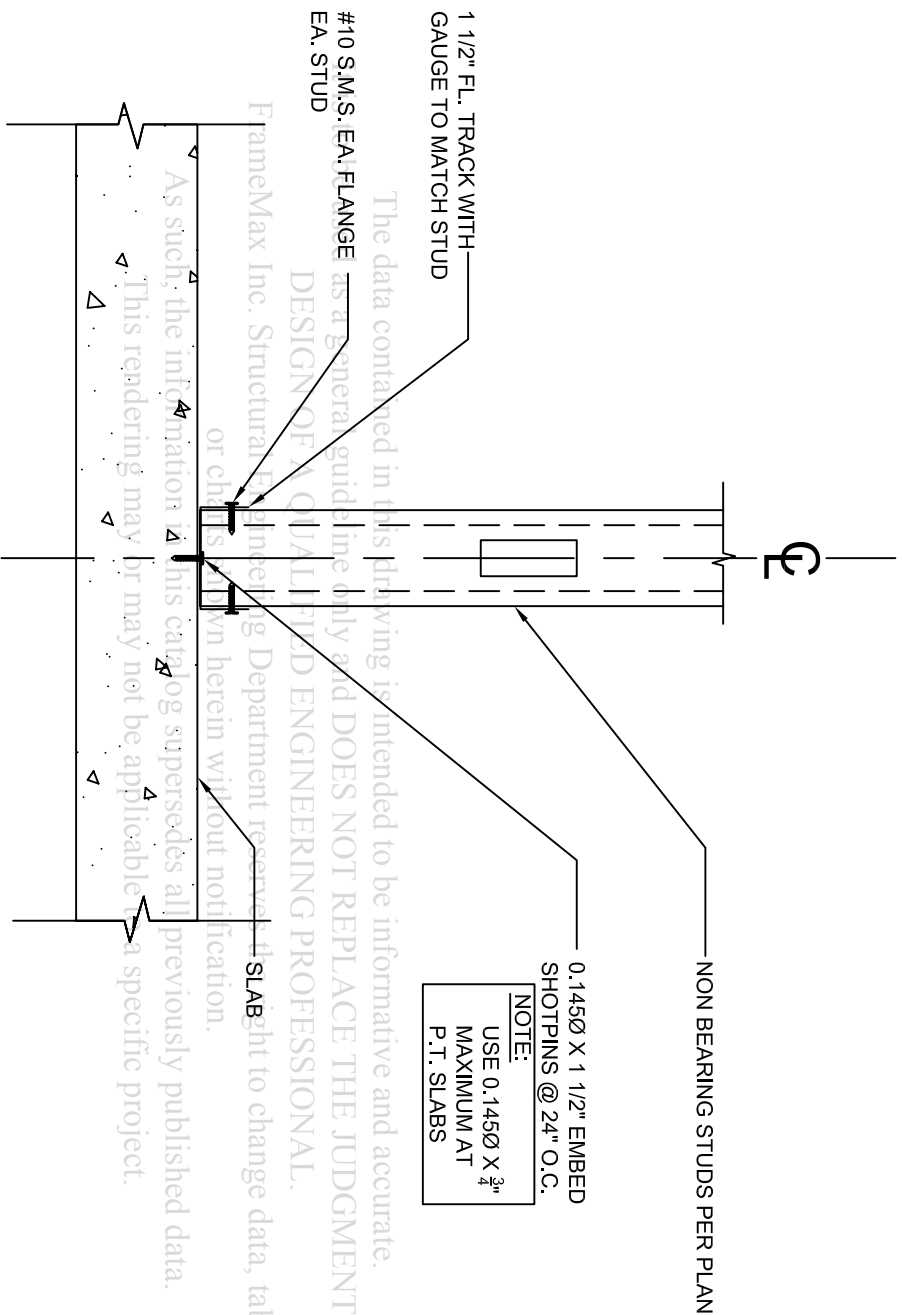
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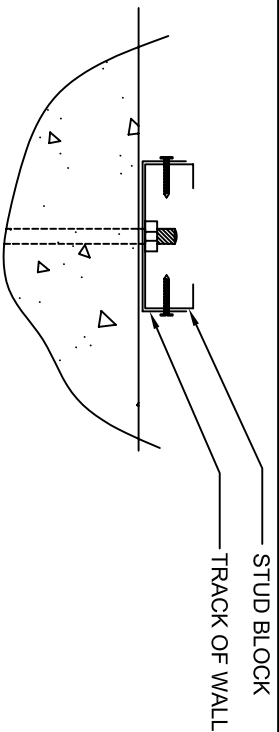
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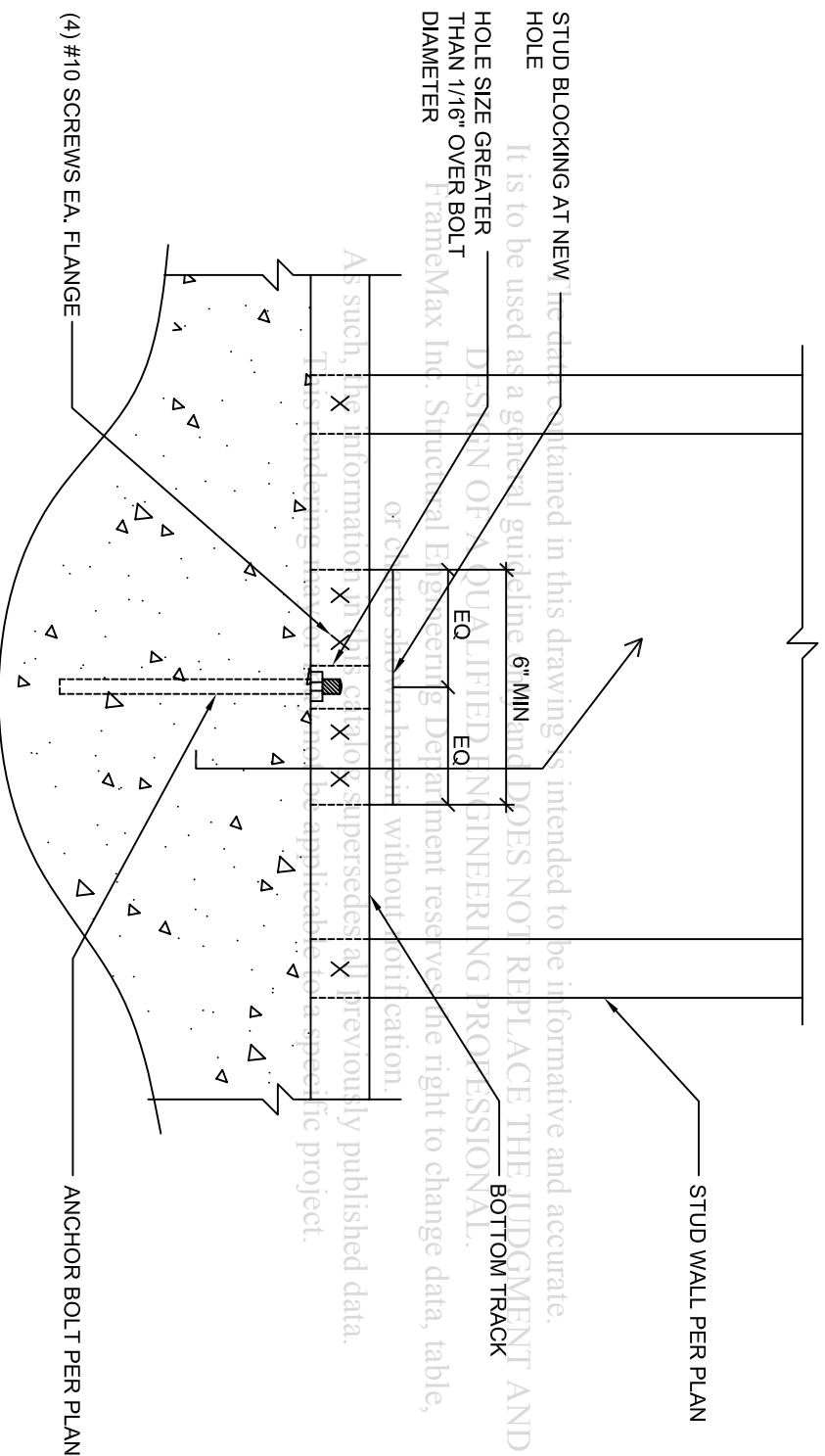
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INTERIOR NON-SHEAR WALL CONNECTION TO SLAB

T1



SECTION VIEW



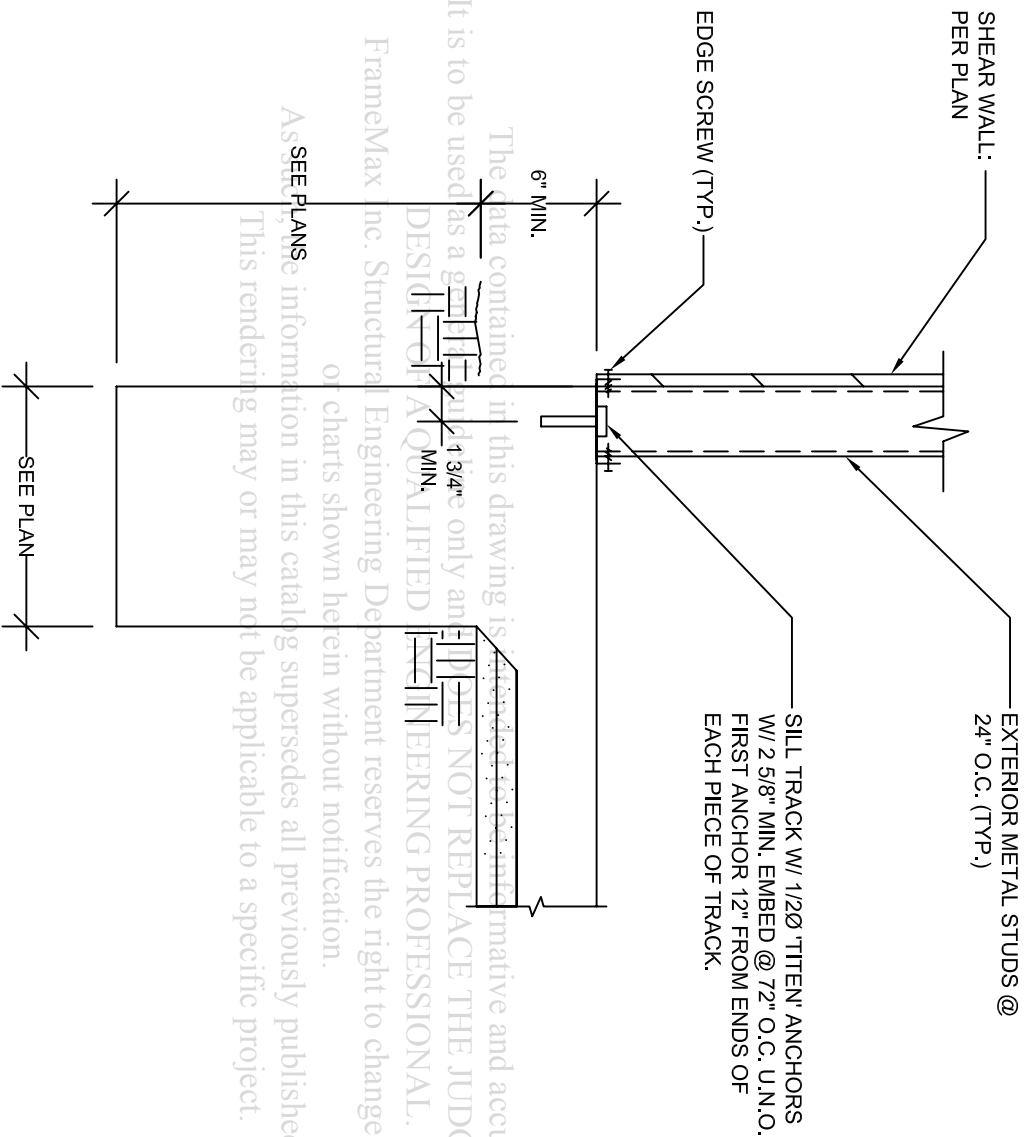
FIX FOR OVERSIZED OR SLOTTED HOLE (1/16" GREATER THAN BELT)

DET_109

Project Name:			.
Site:			.
Job Number:			.
Issue Date:			.
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T2



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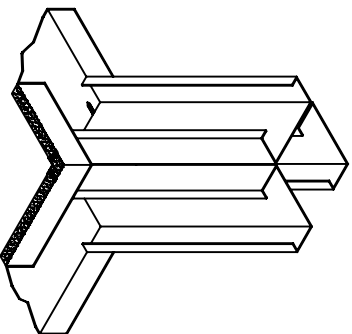
EXTERIOR FOOTING

FM_100

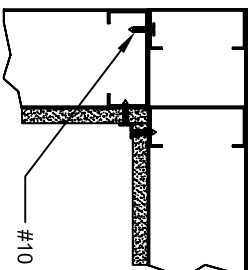
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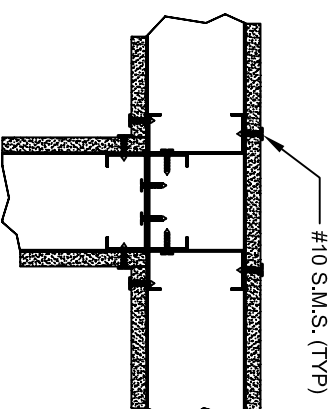
T3



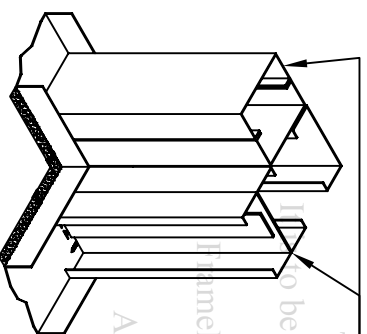
TYPICAL EXTERIOR OR INTERIOR CORNER



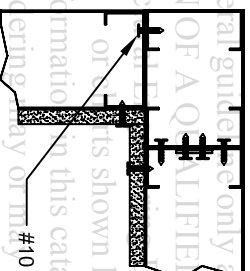
#10 S.M.S. (TYP)



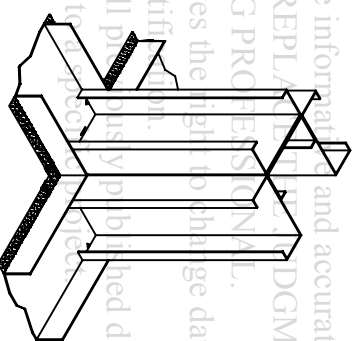
#10 S.M.S. (TYP)



EXTERIOR CORNER WITH STUD HOLDOWN



#10 S.M.S. (TYP)



TYPICAL INTERIOR INTERSECTION

DOUBLE STUD WHERE
HOLDOWN OCCURS WHERE

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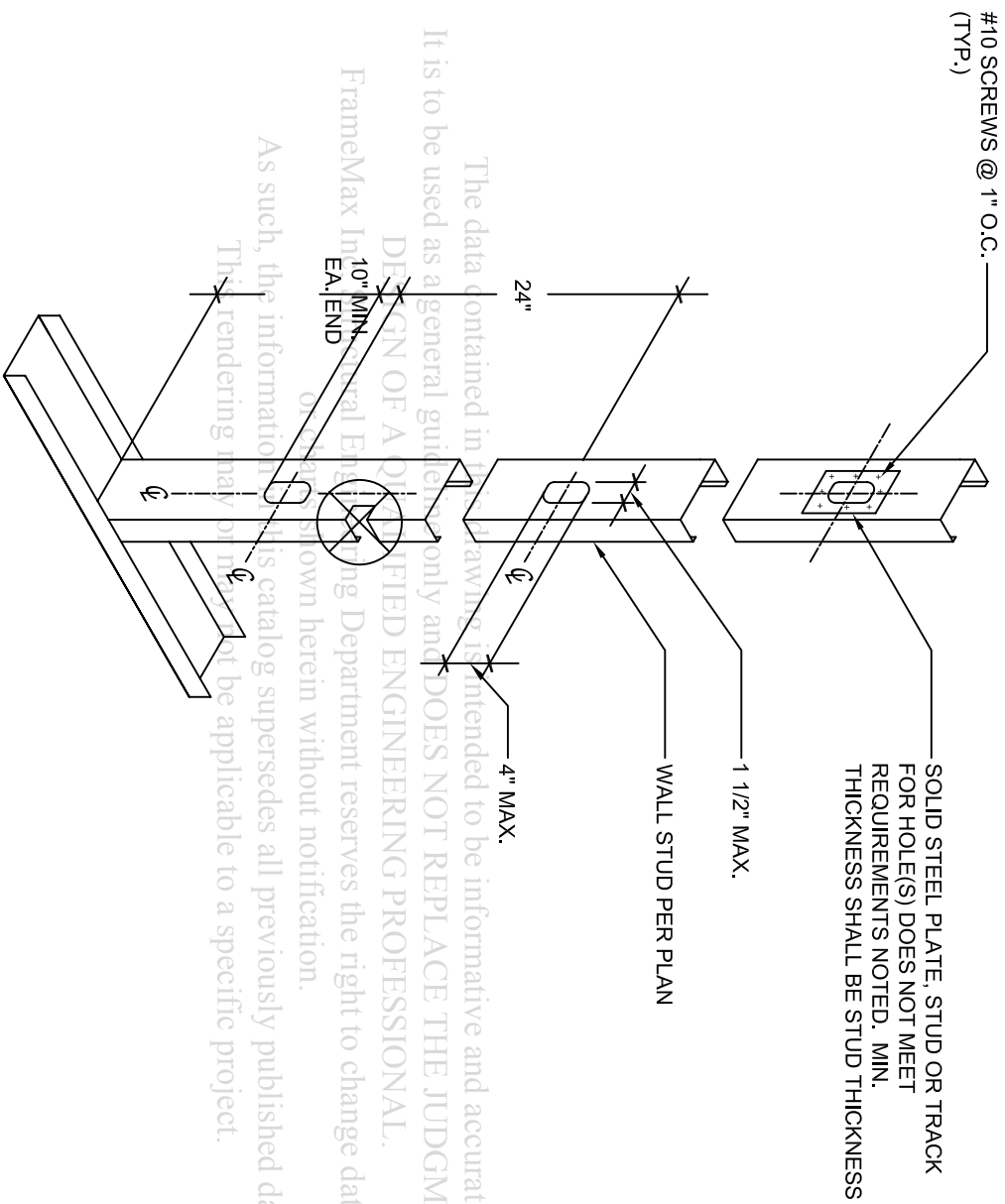
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TYPICAL STUD WALL AT INTERSECTIONS DETAIL FOR BEARING WALLS

T4

NOTES:
-NOTCHING/CUTTING FLANGE OF STUD IS NOT ALLOWED
-VERIFY W/ EOR IF LARGER HOLE IS NEEDED



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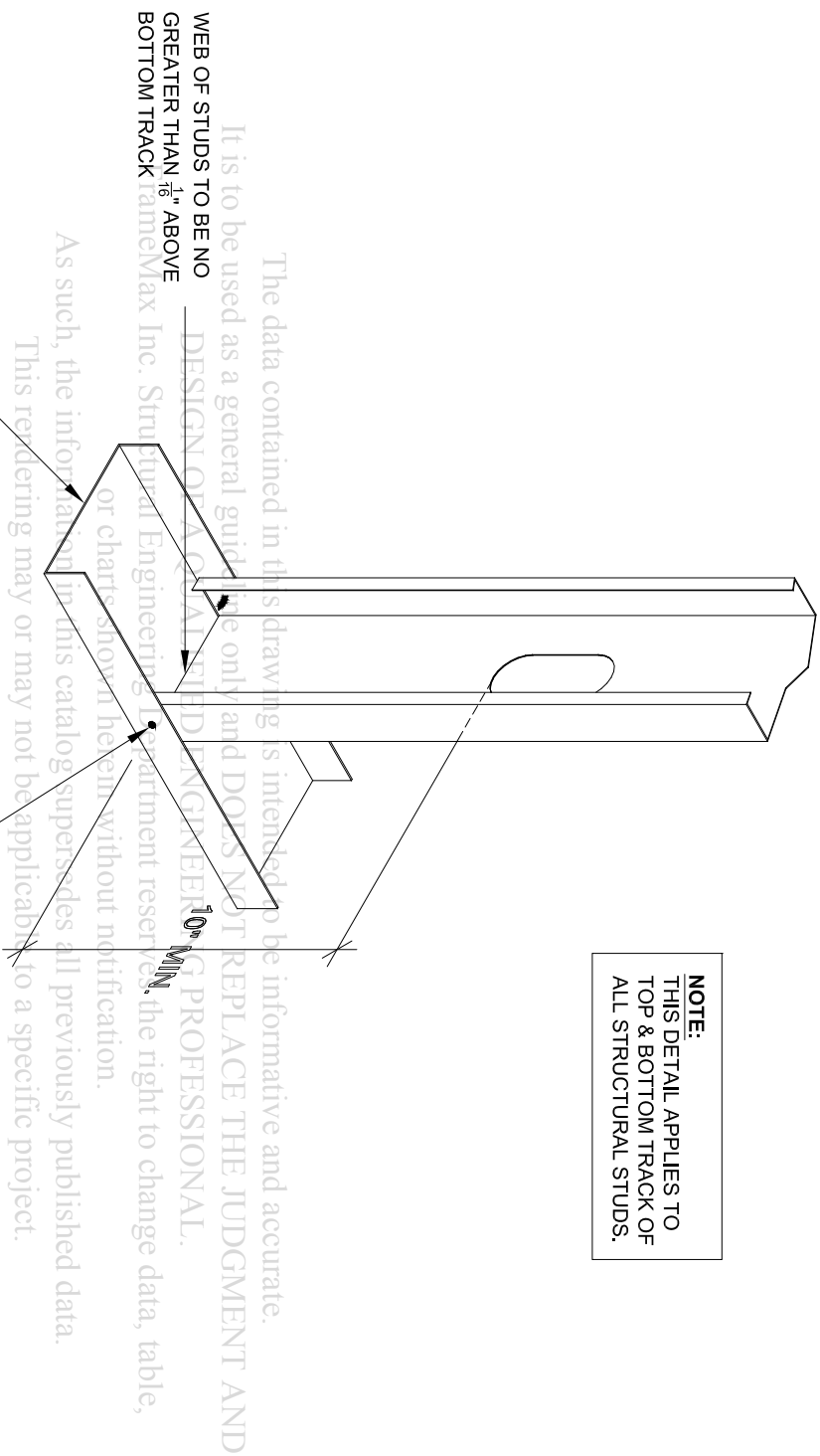
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STUD NOTCH/HOLES

T5

NOTE:
THIS DETAIL APPLIES TO
TOP & BOTTOM TRACK OF
ALL STRUCTURAL STUDS.



TRACK TO BE SAME _____
GAUGE AS STUD MINIMUM
1 1/2" WIDE FLANGES

SCREW ATTACHMENT

TYPICAL STUD TO TRACK CONN. DETAIL

DET_041

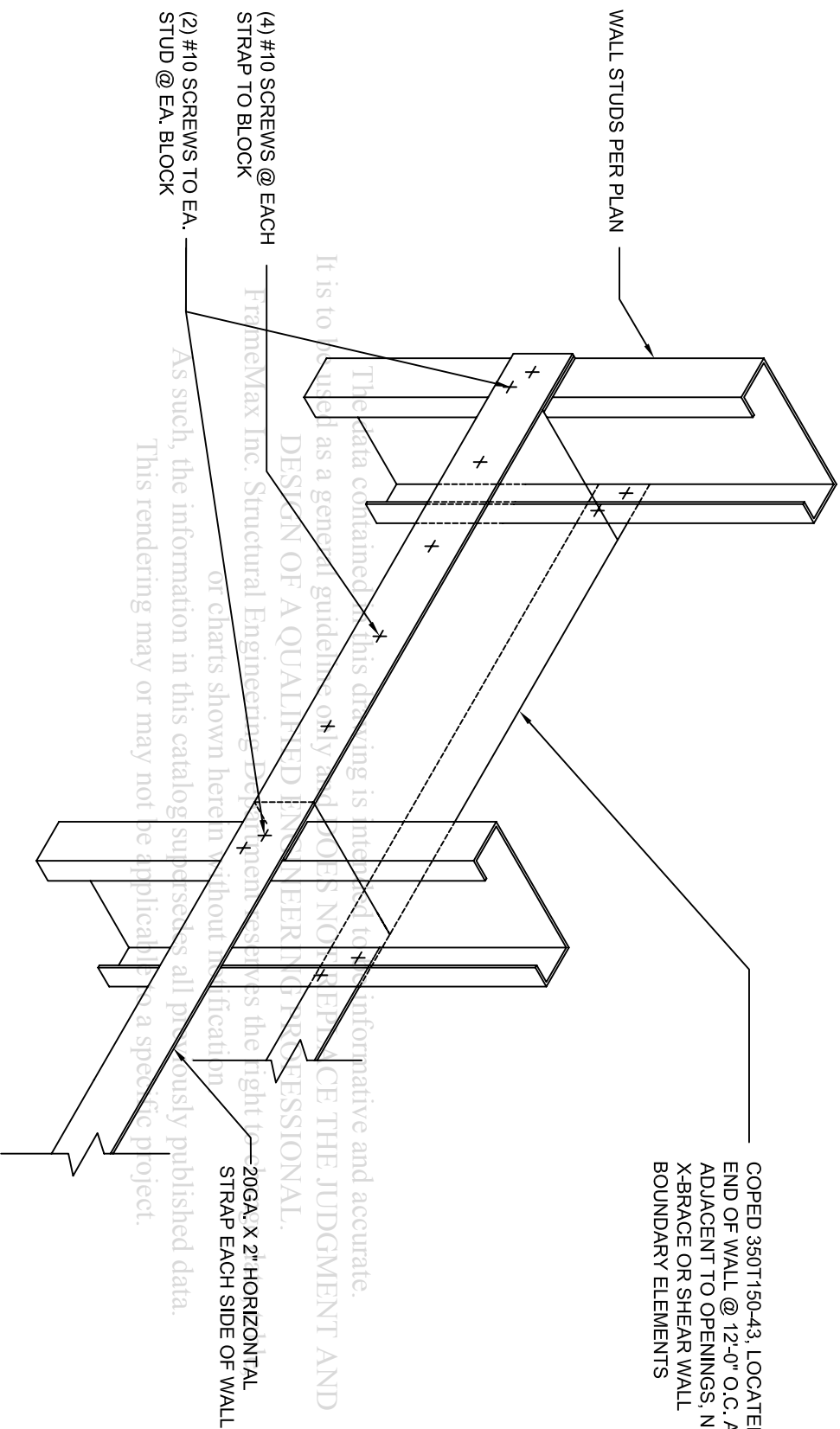
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COPED 350T150-43, LOCATED @ EA.
END OF WALL @ 12'-0" O.C. AND
ADJACENT TO OPENINGS, NEXT TO
X-BRACE OR SHEAR WALL
BOUNDARY ELEMENTS



- (4) #10 SCREWS @ EACH STRAP TO BLOCK
- (2) #10 SCREWS TO EA. STUD @ EA. BLOCK
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HORIZONTAL BRACING CONNECTION-WALL STUD FLANGE BRACING

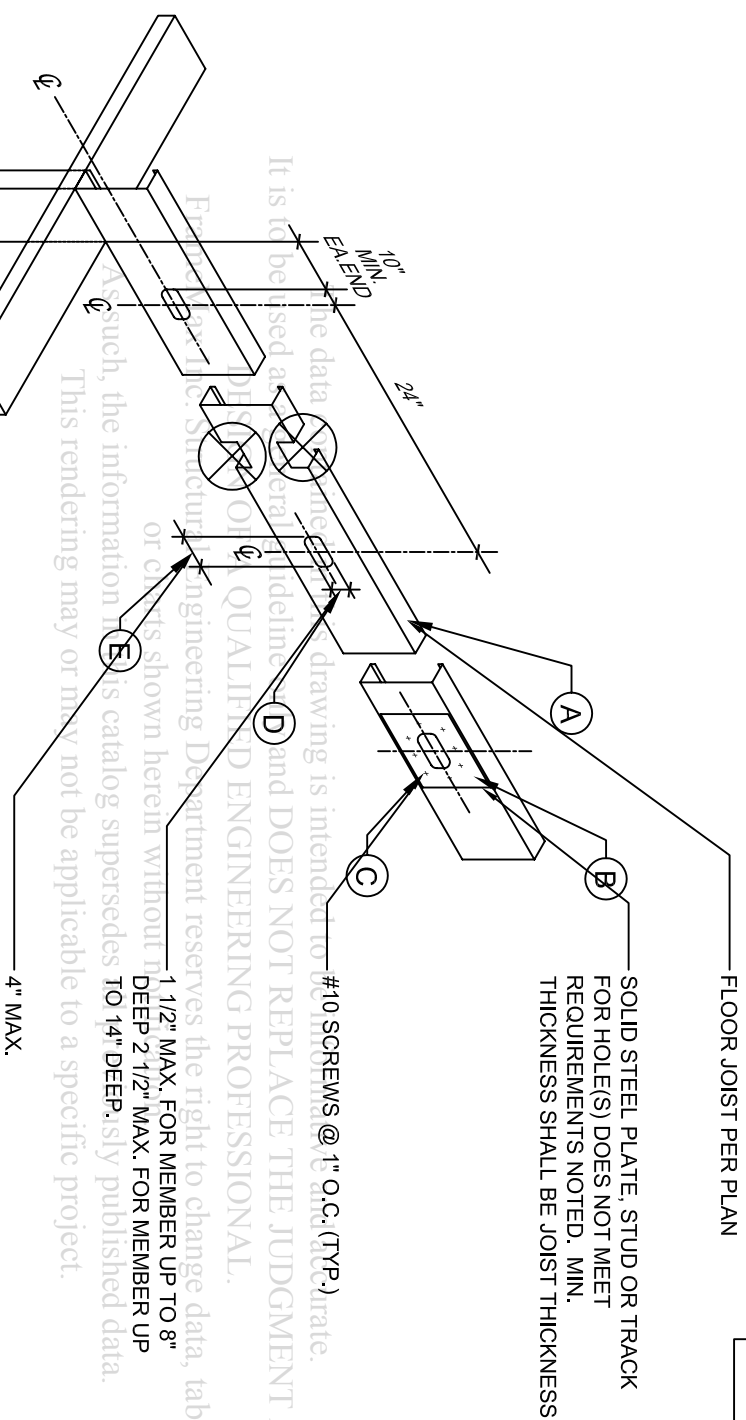
DET_143

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Job Number:			.
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T7

NOTES:
 -NOTCHING CUTTING FLANGE OF
 JOIST IS NOT ALLOWED
 -VERIFY W/ EOR IF LARGER HOLE IS
 NEEDED



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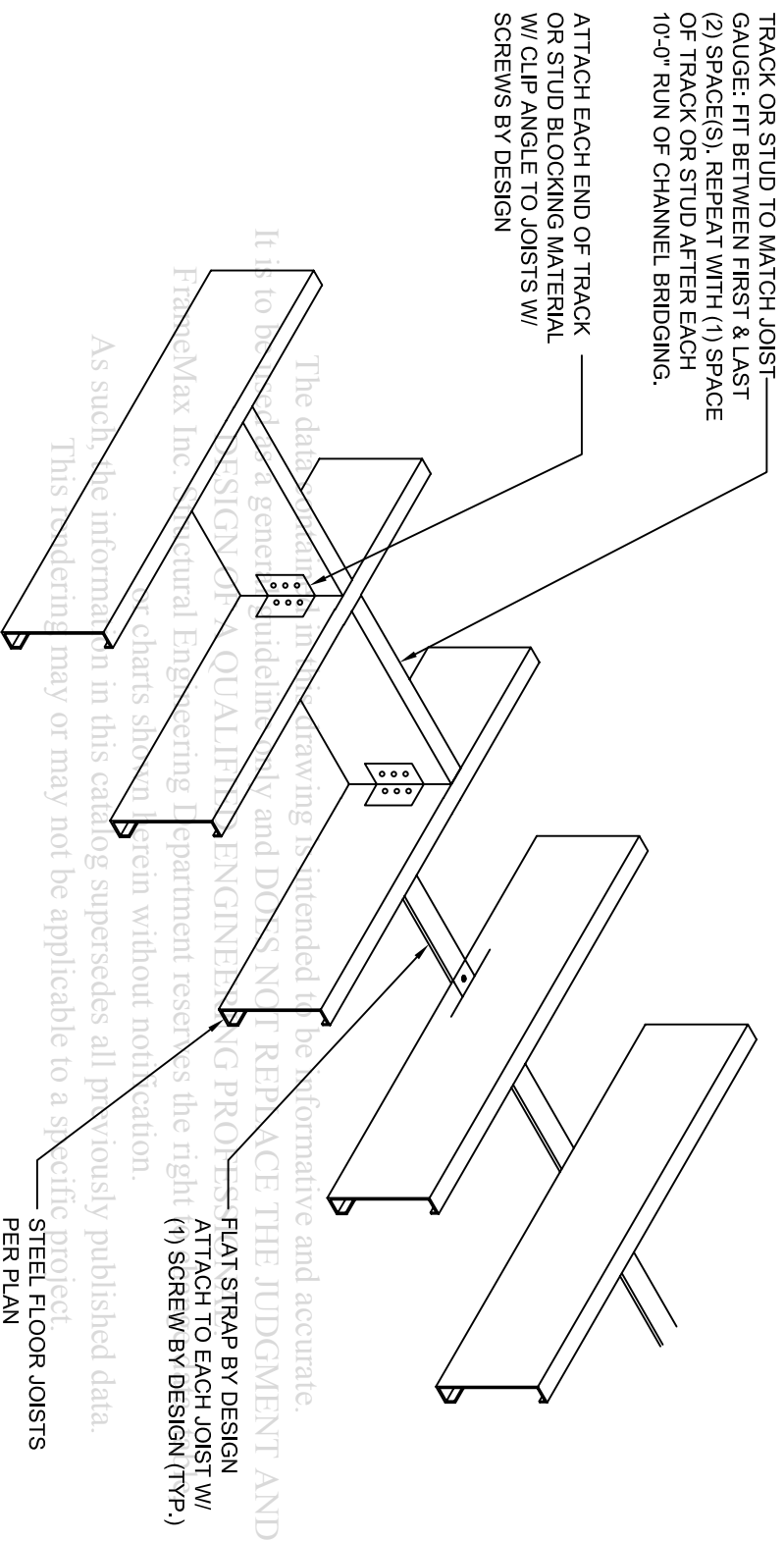
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JOIST NOTCH AND HOLES

T8

NOTE:
-DETAIL BELOW ALSO ASSUMES TOP
FLANGE OF JOISTS ARE SHEATHED.
(NOT SHOWN FOR CLARITY)



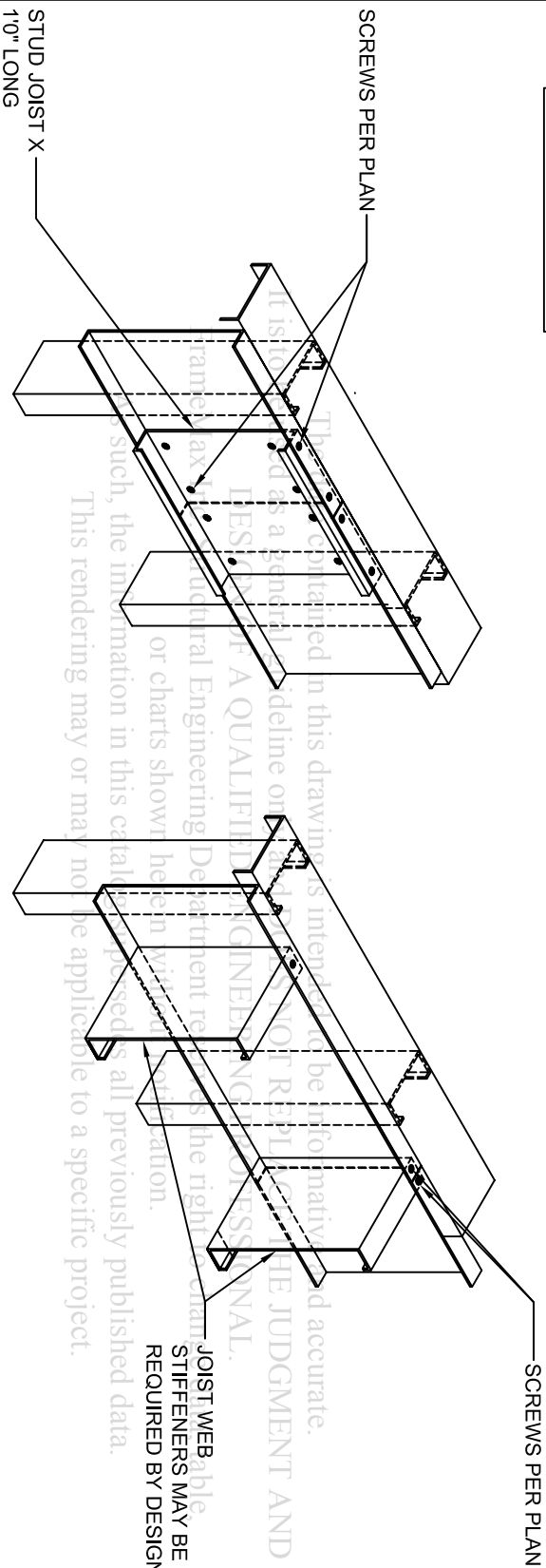
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JOIST BRIDGING DETAIL

T9

NOTE:
JOISTS & STIFFENERS
ARE NOT SHOWN FOR
CLARITY



DETAIL JOIST TRACK SPLICE

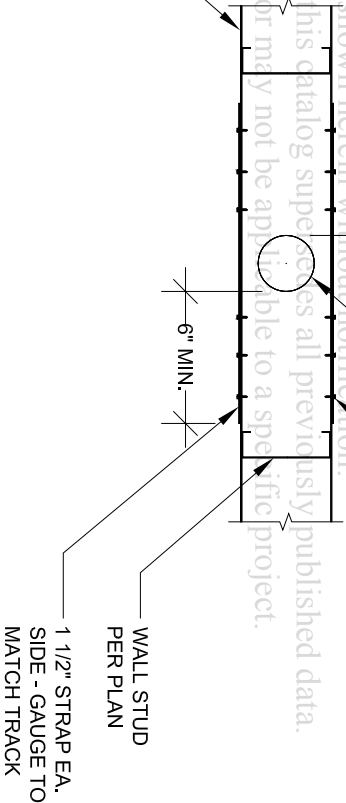
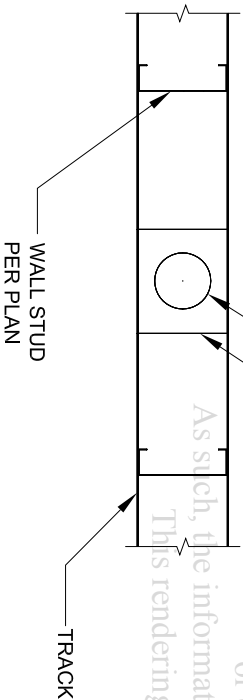
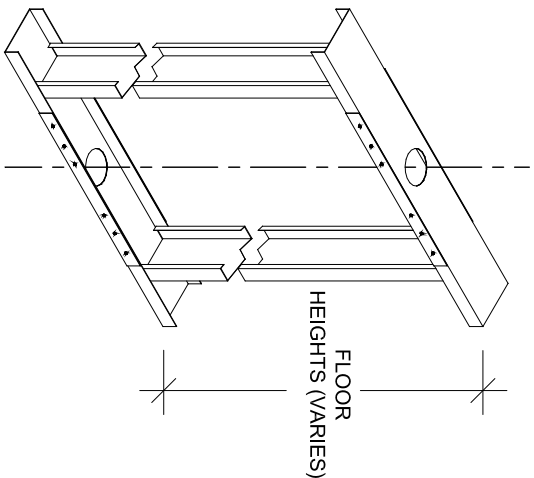
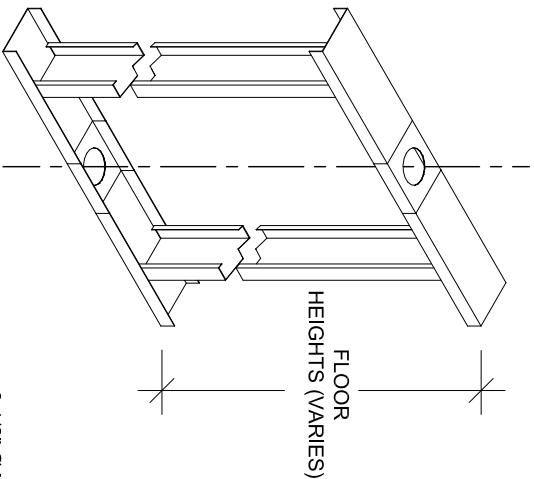
DET_062

Project Name:			.
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T10

NOTE:
1. STRAPS NOT REQUIRED FOR HOLES UP TO 2"Ø MAX.
2. HOLES MUST BE DRILLED NOT TORCHED OR PLASMA CUT.



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NON-BEARING WALL

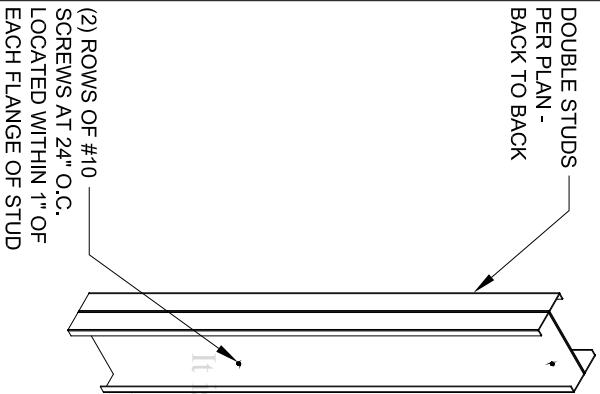
BEARING WALL

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Site:		
Job Number:		
Issue Date:		
Revision	Date	Description
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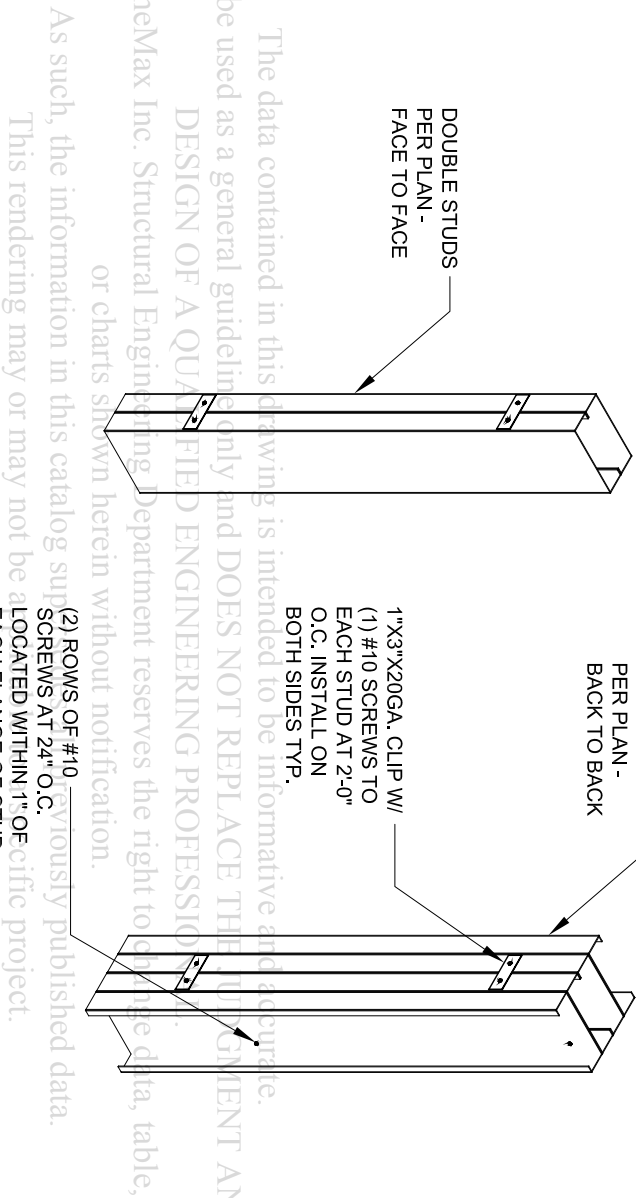
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TRACK PENETRATION DETAIL AT 4" WALL

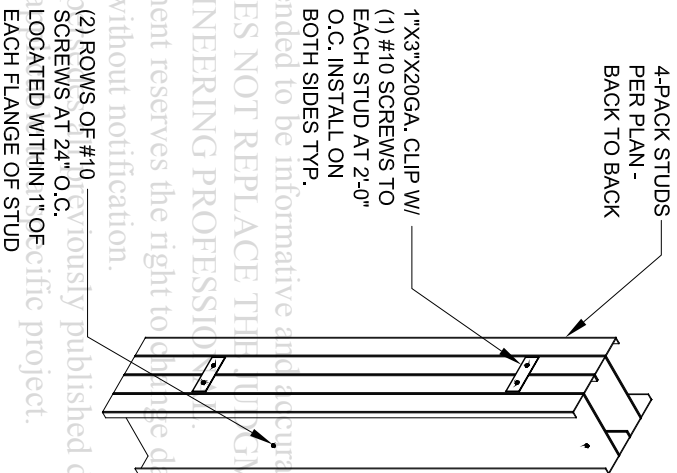
T112



A BACKED, SCREWED



B BACKED, SCREWED



C BACKED, SCREWED

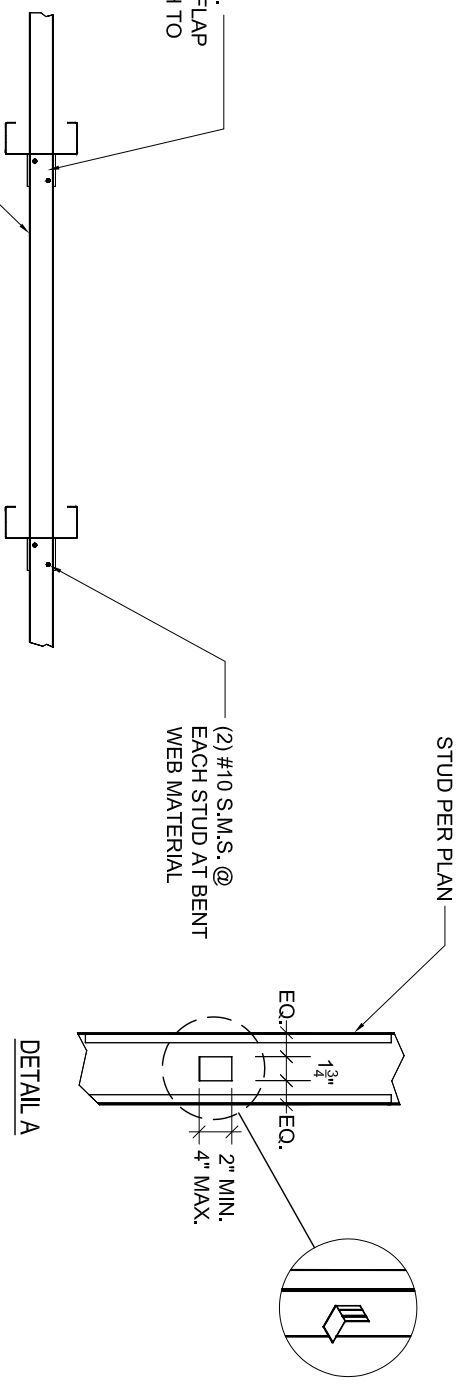
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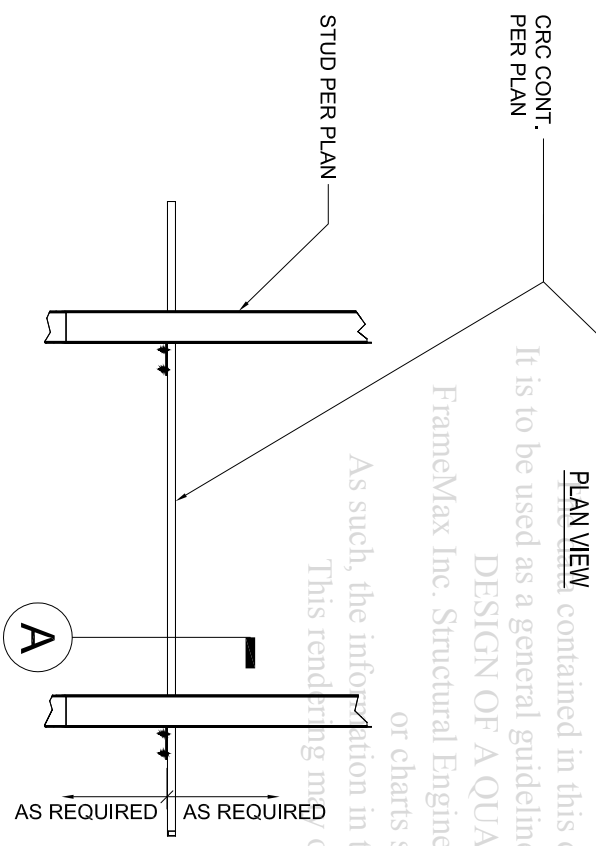
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BUILT-UP POST CONDITIONS

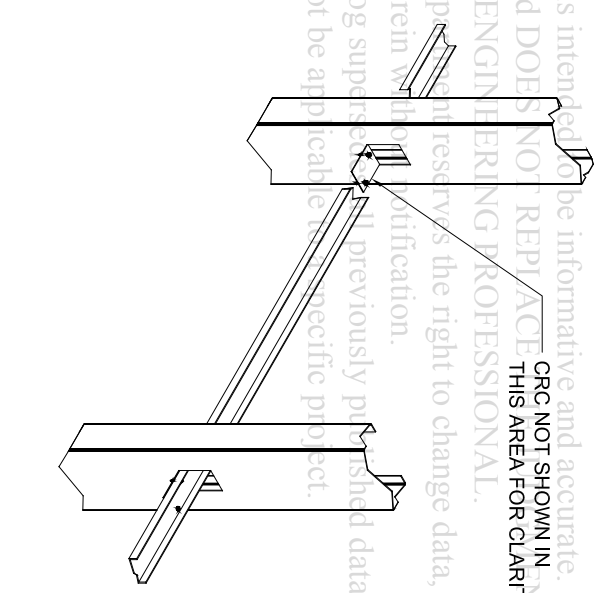
T13



DETAIL A



PLAN VIEW



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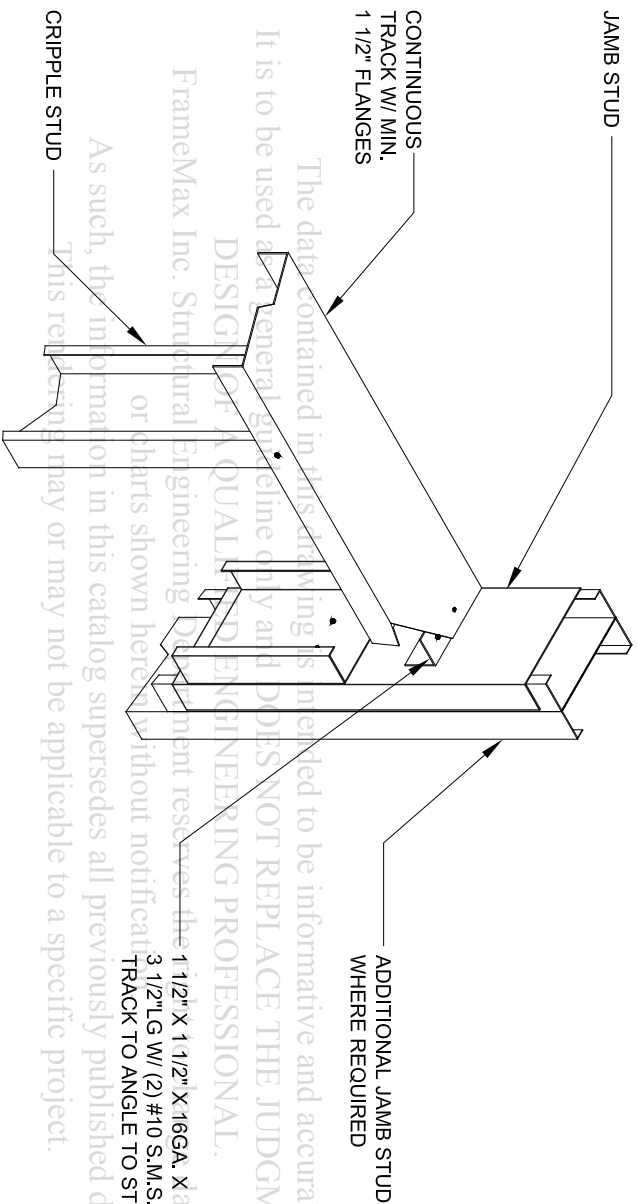
WALL ELEVATION

Project Name:		
Site:		
Job Number:		
Issue Date:		
Revision	Date	Description
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TYPICAL CRC PUNCH-WALL STUD WEB BRACING

T14



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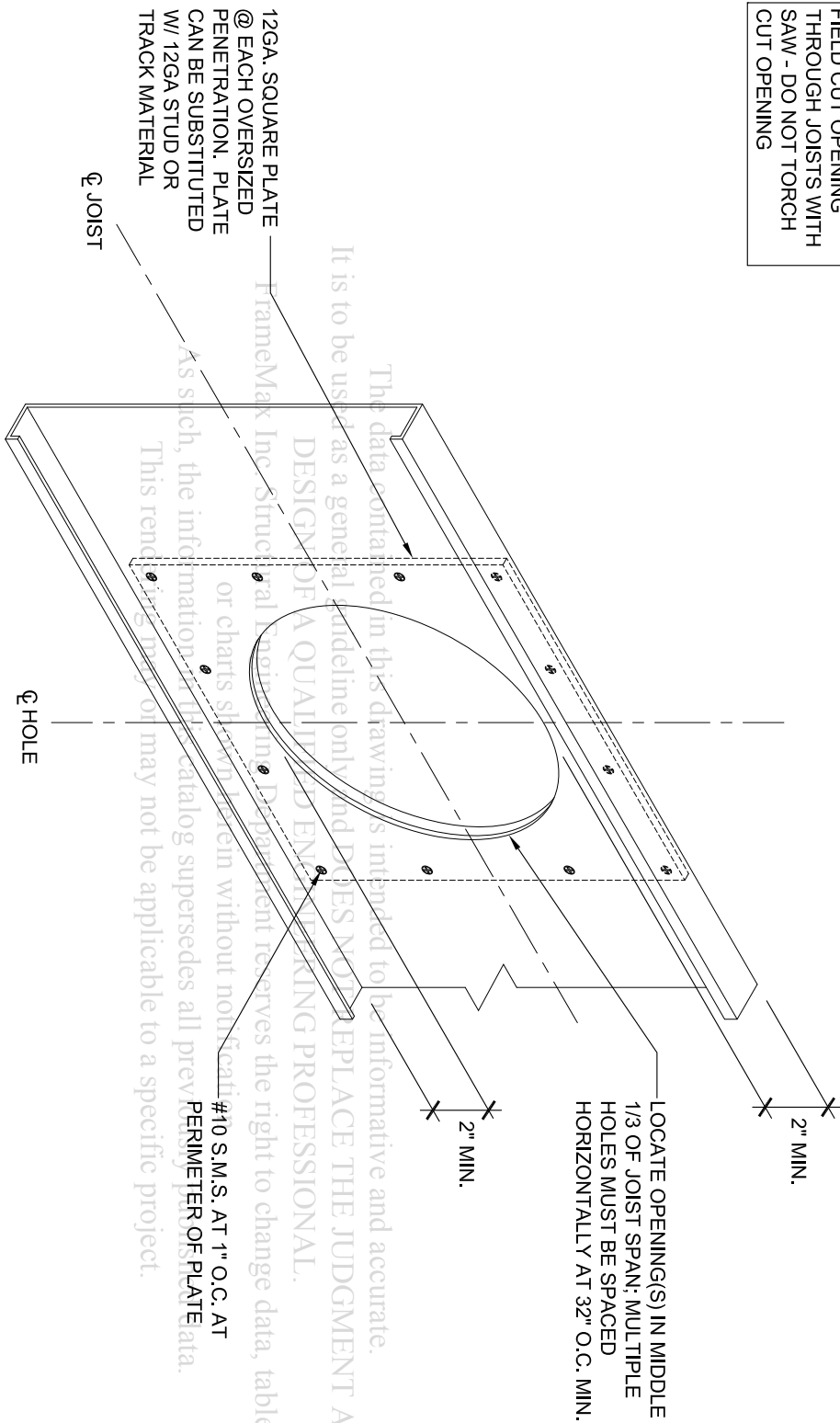
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TYPICAL HEAD/SILL CONNECTION DETAIL

T115

NOTE:
FIELD CUT OPENING
THROUGH JOISTS WITH
SAW - DO NOT TORCH
CUT OPENING



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JOIST REINFORCEMENT AT HVAC & PLUMBING PENETRATIONS

DET_059

Project Name:			.
Site:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
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T16

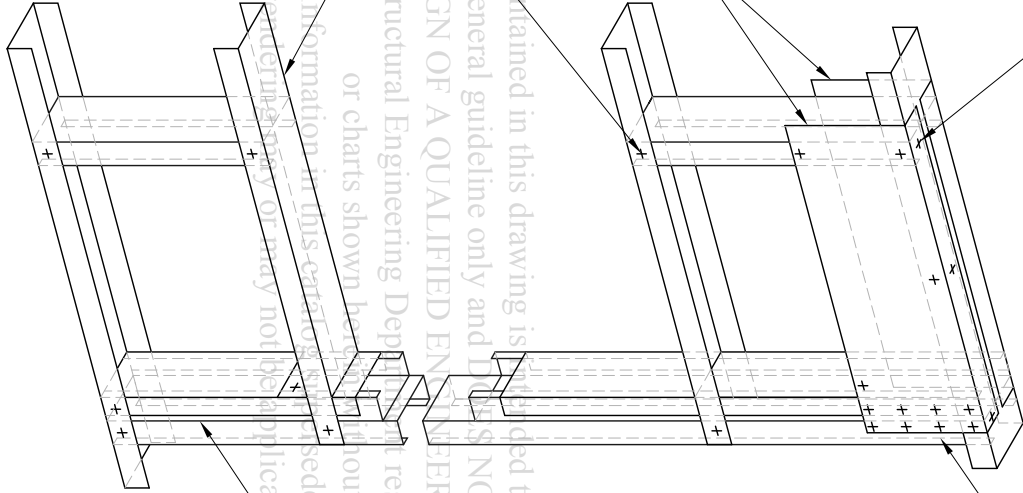
#8 SCREWS AT TOP AND
SIDE AT 12" O.C.

END SCREWS PER PLAN. SCREW
TO BOTH KING STUDS WITH CAP
TRACK WHERE THOSE OCCUR

DOUBLE L-HEADER PER PLAN

#8 SCREW AT TOP AND
BOTTOM OF EACH CRIPPLE
STUD

SILL TRACK - COPE AND
BEND ENDS. FASTEN WITH
(2) #8 SCREWS MINIMUM.



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KING STUDS WITH CAP
TRACK (TYP.)

TYPICAL OPENING IN BEARING WALL

DET_146

Project Name: .

Site: .

Job Number: .

Issue Date: .

Revision Date Description

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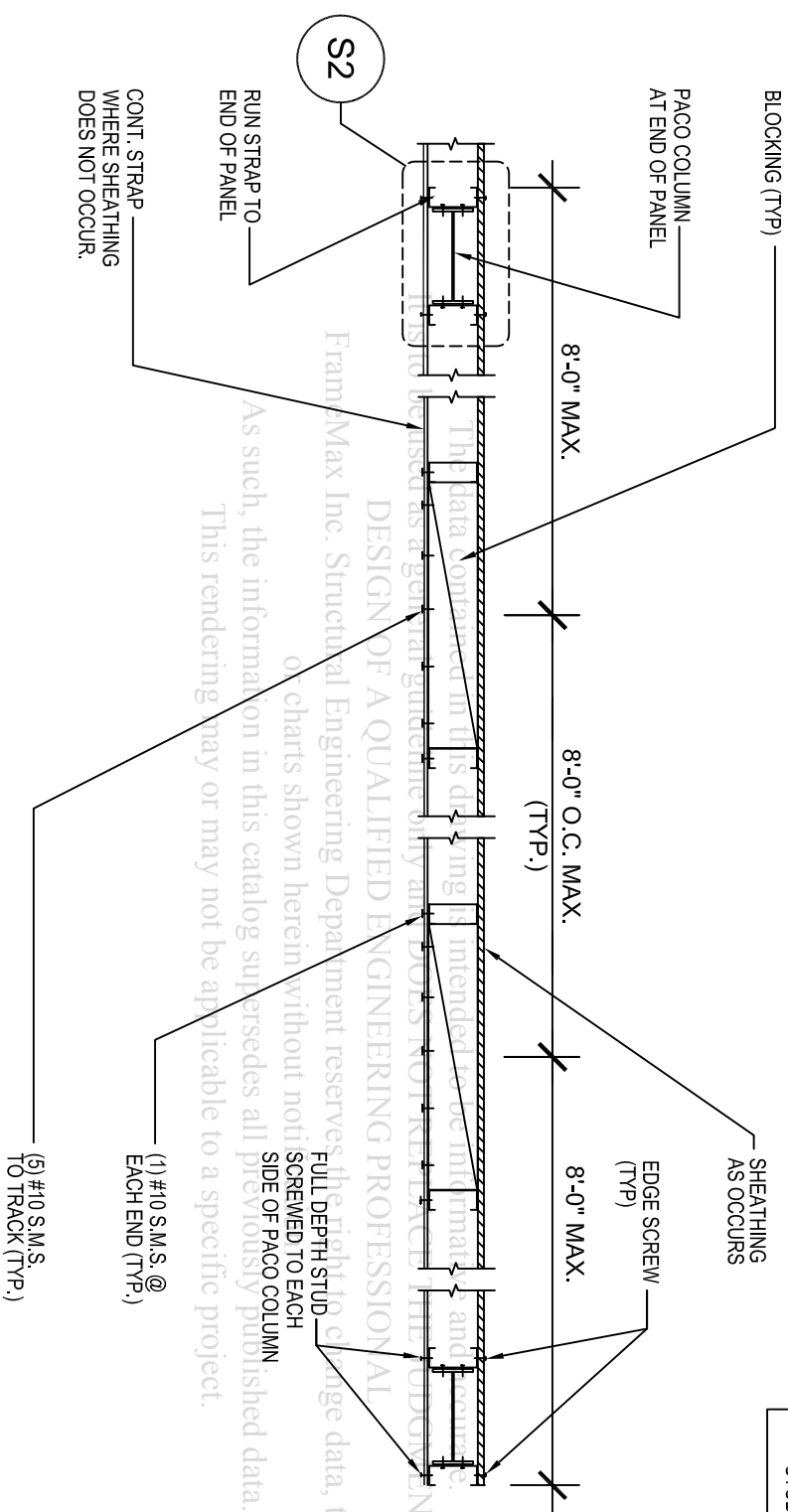
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T17

- NOTES:**
- (1) STRAP TO RUN FULL LENGTH OF PANEL AND ATTACH TO POST/COLUMN.
 - (2) BLOCKING TO BE 400T150-43 MAT'L AND IS TO OCCUR AT 8'-0" O.C. MAX. AT ALL LOCATIONS.
 - (3) STRAP TO BE 20GA. X 2 1/2".
 - (4) WHERE OPENING OCCURS WITHIN WALL - LOCATE BLOCK AT BAY ADJACENT TO OPENING AND TERMINATE STRAP AT STUD NEAREST OPENING



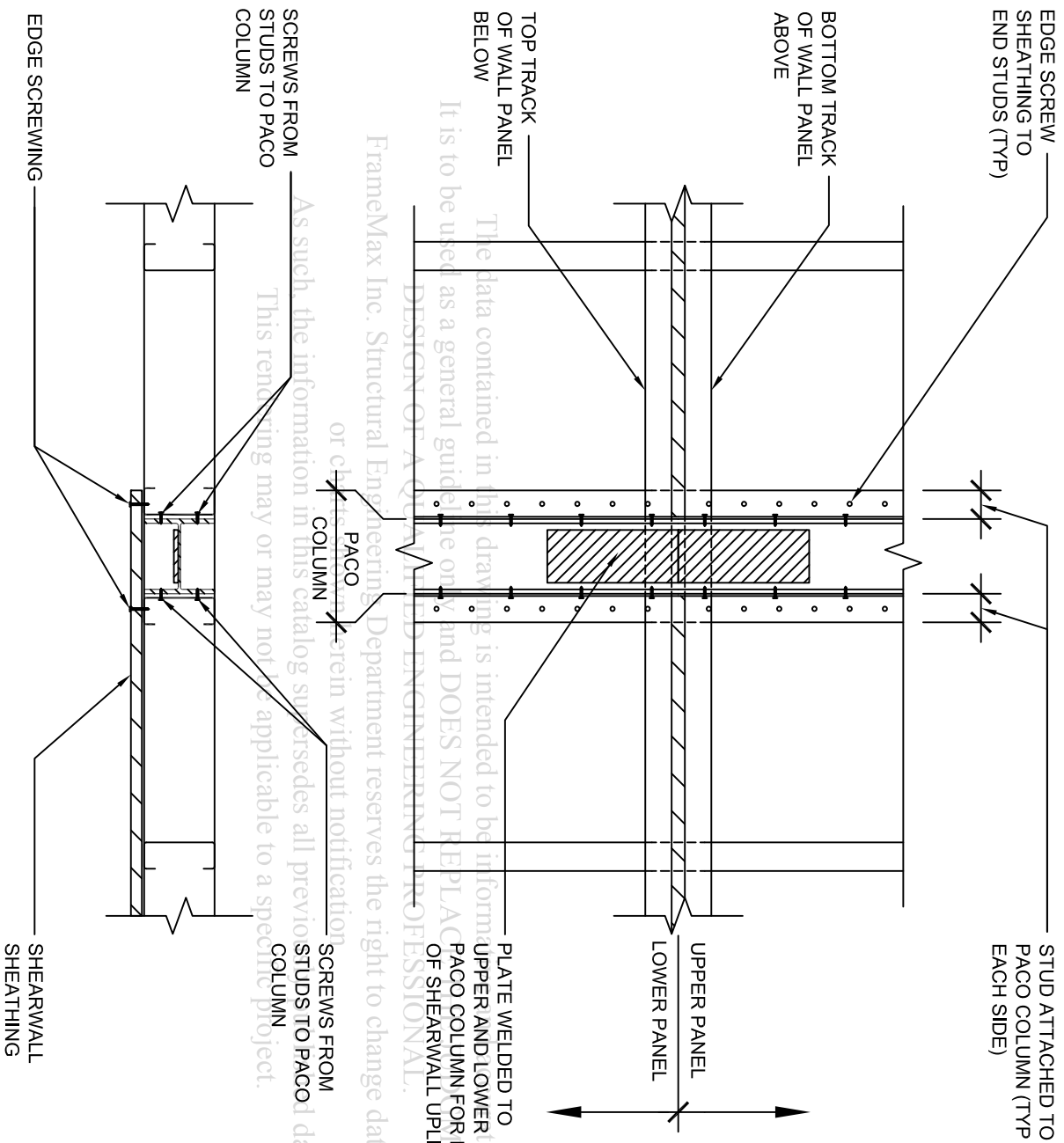
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PACO FRAMING / STUD BRACING

S1



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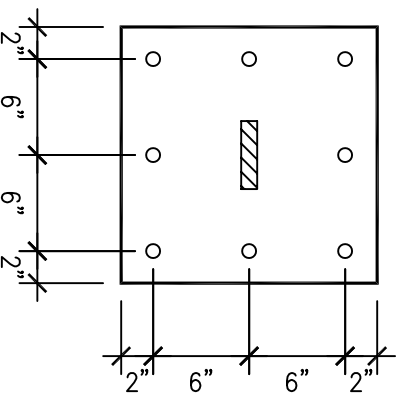
PACO COLUMN END ELEMENT FOR UPLIFT TRANSFER

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Issue Date:			.
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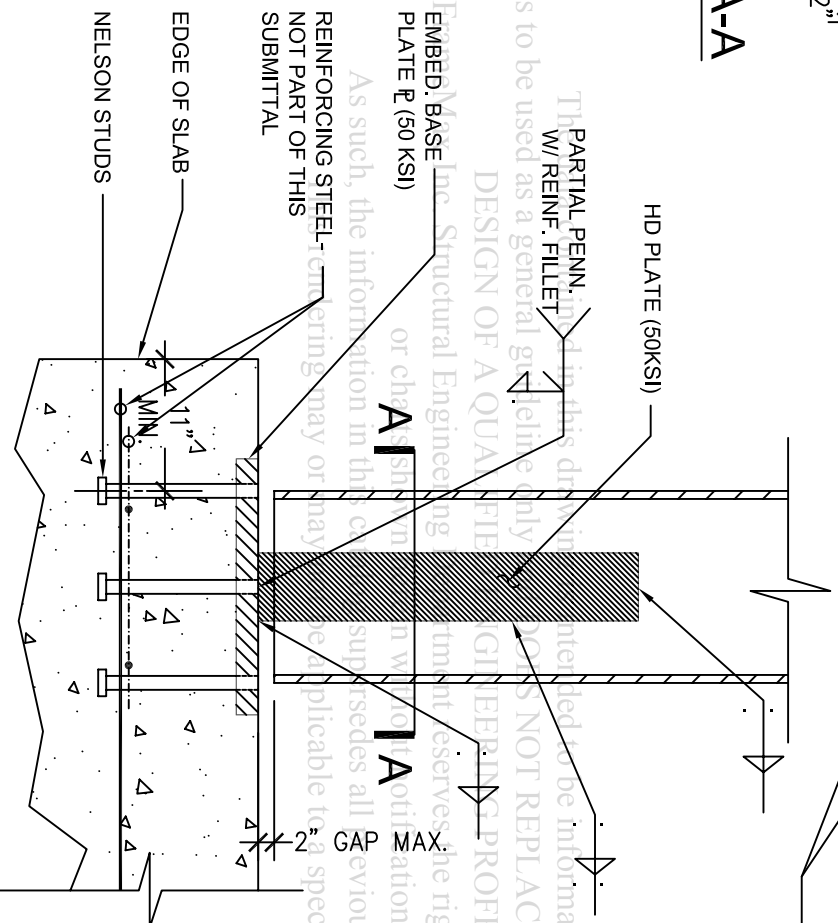
S2

TOP VIEW



#12 SMS AT 12"
O.C. OR EQUAL

SECTION A-A



NOTE:

1. THE CENTERLINE OF THE HOLDDOWN PLATE MAY BE OFFSET FROM THE CENTERLINE OF THE EMBED PLATE BY 2" MAX.
2. PACO SIDE COLUMNS NOT SHOWN FOR CLARITY ON ELEVATION.
3. PACO COLUMN NOT SHOWN IN SECTION A-A FOR CLARITY.
4. UPLIFT CAPACITY OF CONNECTION UPWARDS OF 200K.

WHERE LOADS PERMIT - PACO COLUMN MAY BE SUBSTITUTED W/ COLD FORMED STUDS AS SHOWN IN DETAIL S2

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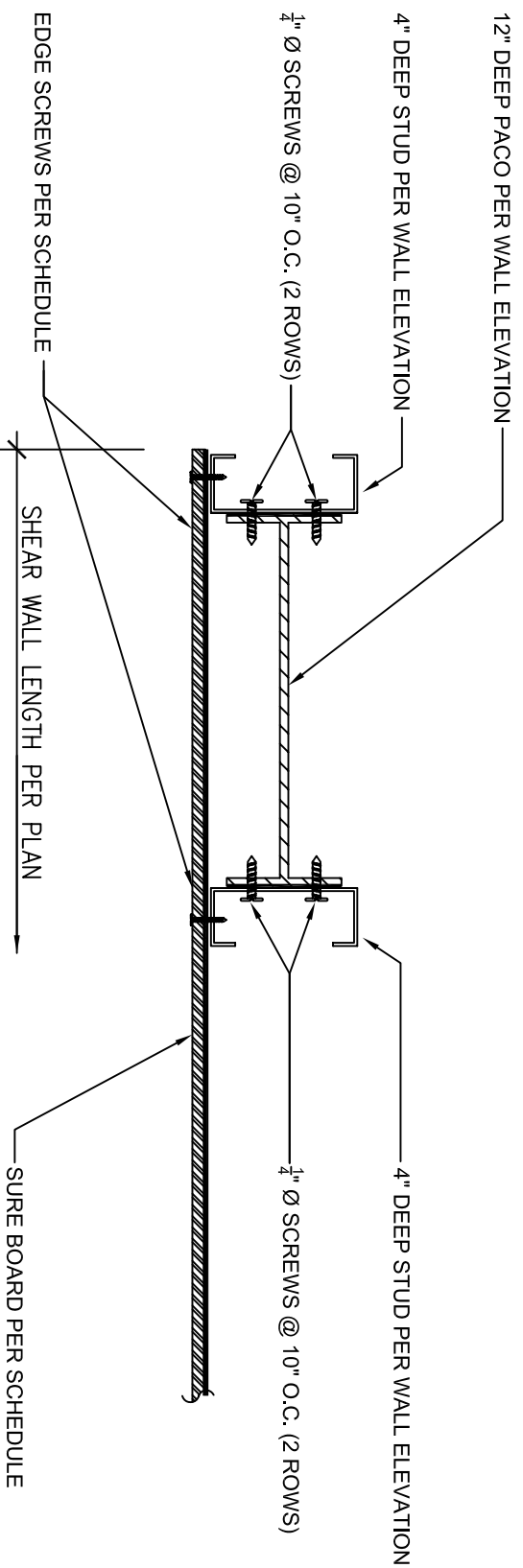
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PACO COLUMN HOLDOWN CONNECTION

Project Name:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
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S3

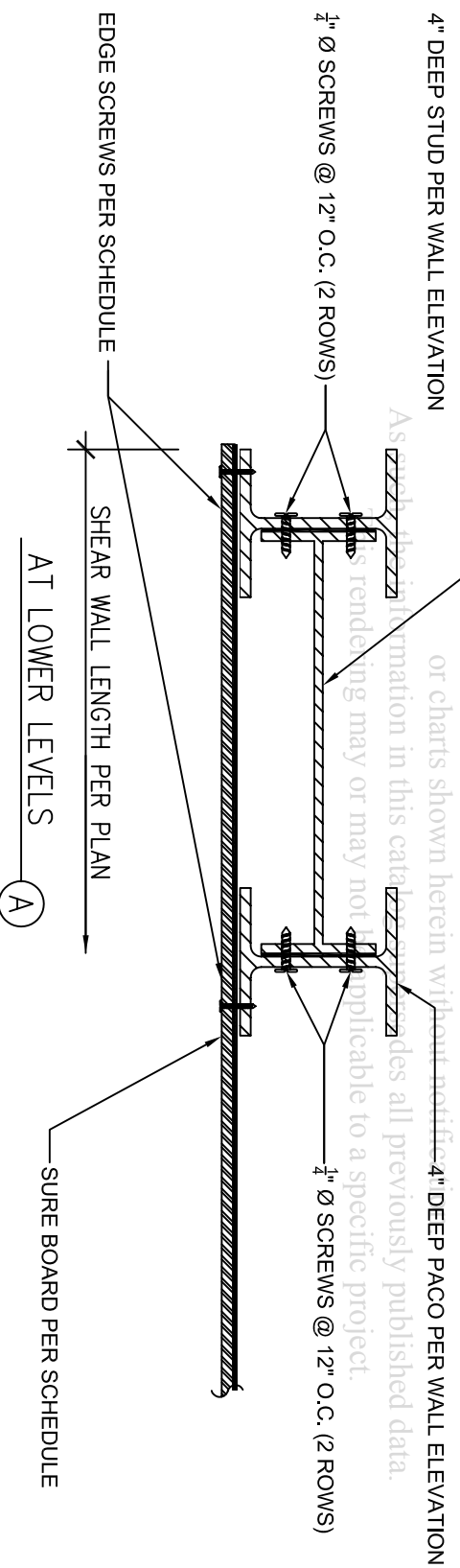


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TYPICAL PACO CONFIGURATION

Project Name:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
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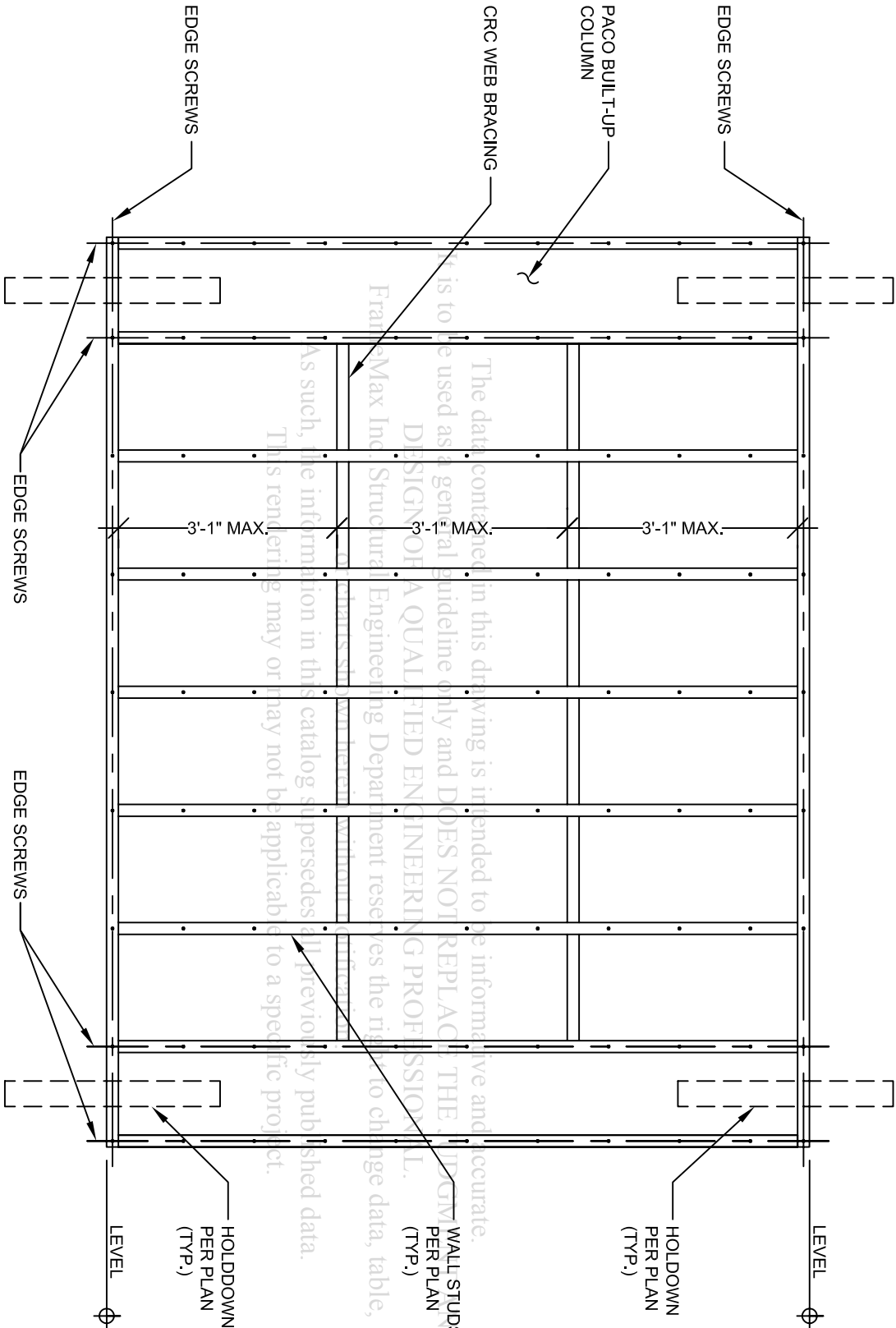
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S4

NOTE:

- 1. PROVIDE FIELD SCREW SPACING AT ALL BACKING NOT DESIGNATED AS EDGE SCREW.



SUREBOARD SHEARWALL ELEVATION WITH PACO END ELEMENT

DET_230

Project Name:			.
Site:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
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△			
△			
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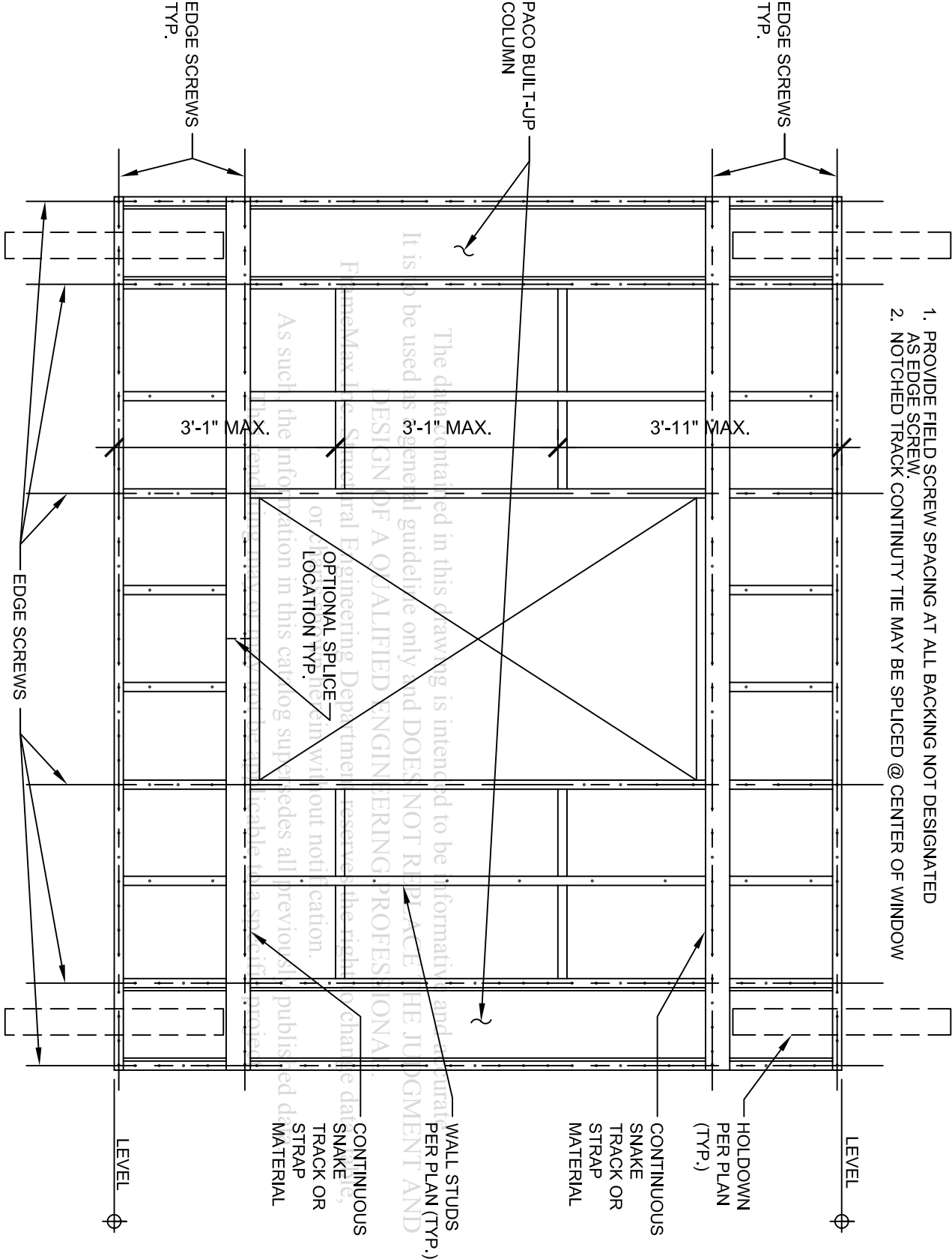
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S5

NOTE:

1. PROVIDE FIELD SCREW SPACING AT ALL BACKING NOT DESIGNATED AS EDGE SCREW.
2. NOTCHED TRACK CONTINUITY TIE MAY BE SPLICED @ CENTER OF WINDOW



TYPICAL SUREBOARD SHEARWALL W/ WINDOW OPENING ELEVATION

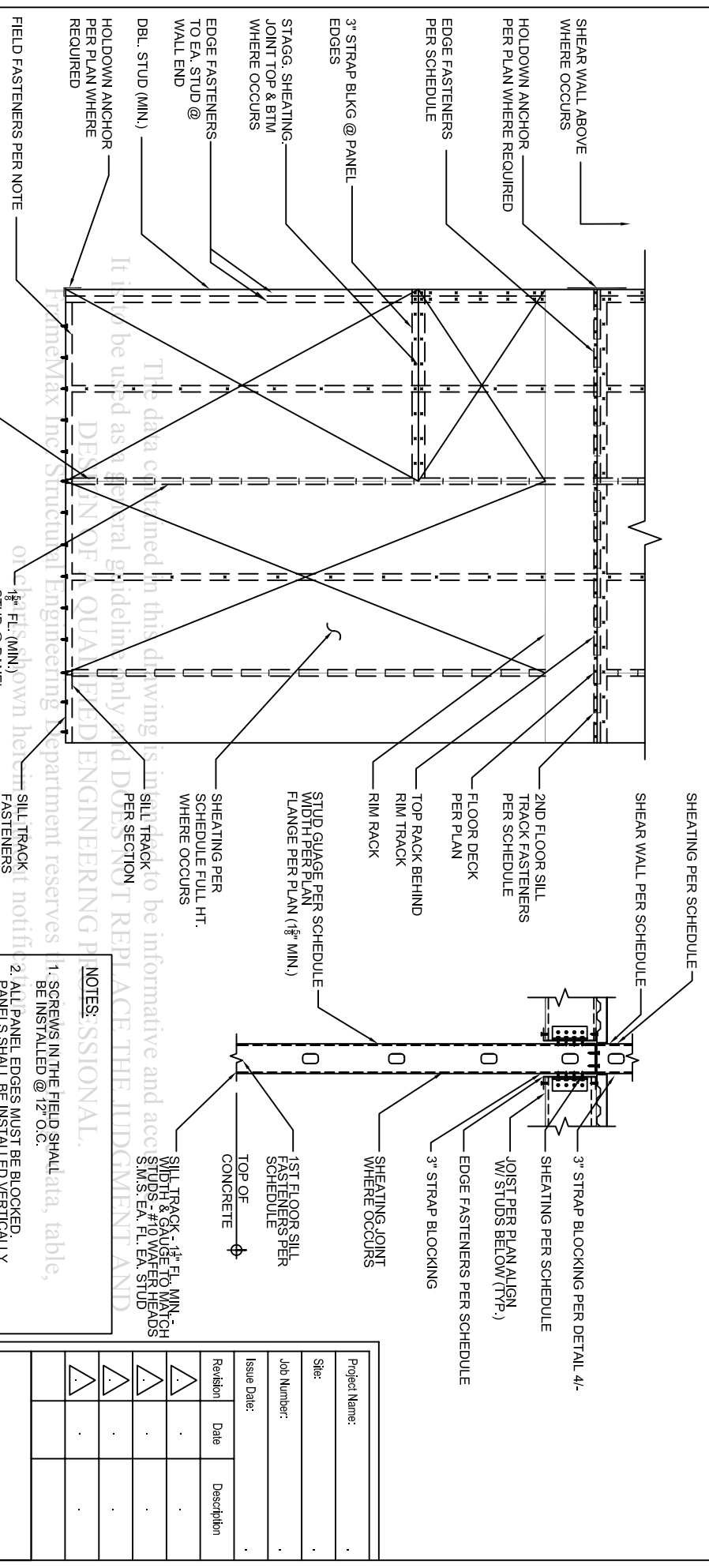
DET_239

Project Name: .		
Site: .		
Job Number: .		
Issue Date: .		
Revision	Date	Description
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S6



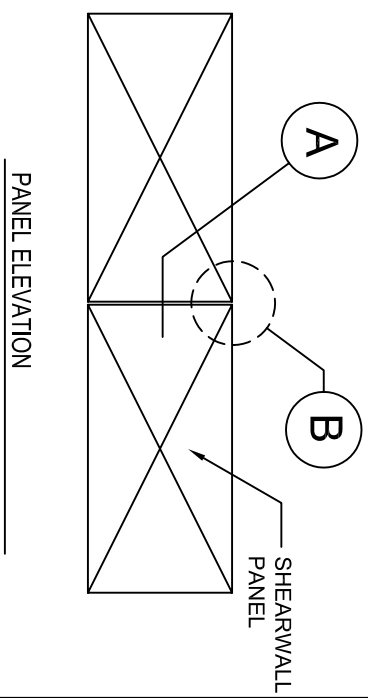
SUREBOARD SHEAR WALL SCHEDULE							
SHEAR WALL TYPE	SHEATHING	MIN. FRAMING THICKNESS (GA.)	PANEL EDGE SCREWS	SHEAR TRANSFER SCREWS	SILL TRACK FASTENERS TO TRACK BELOW	SILL TRACK FASTENERS TO CONC. SLAB	CAPACITY (LRFD)
A	22GGA. SUREBOARD	.033" (20GA.)	#10 SCREWS @ 6" O/C	#10 SCREWS @ 4" O/C	#10 SCREWS @ 4" O/C	N/A	597 PLF
B	22GGA. SUREBOARD	.043" (18GA.)	#10 SCREWS @ 3" O/C	#10 SCREWS @ 4" O/C	#10 SCREWS @ 4" O/C	N/A	1180 PLF
C	22GGA. SUREBOARD	.0566" (16GA.)	#10 SCREWS @ 3" O/C	#10 SCREWS @ 6" O/C	#10 SCREWS @ 6" O/C	N/A	1592 PLF
D	22GGA. SUREBOARD	.0566" (16GA.)	#10 SCREWS @ 2" O/C	#10 SCREWS @ 4" O/C OR #12 SCREWS @ 6" O/C	#10 SCREWS @ 4" O/C OR #12 SCREWS @ 6" O/C	MIN. EMBED EXP. 3" X 24" ANCHORS @ 16" O/C	1903 PLF

- NOTES:**
- SCREWS IN THE FIELD SHALL BE INSTALLED @ 12" O.C.
 - ALL PANEL EDGES MUST BE BLOCKED. PANELS SHALL BE INSTALLED VERTICALLY.
 - EDGE SCREW/MULTIPLE STUDS AT HOLDOWNS PER PANEL EDGE FASTENERS SCHEDULE, U.O.N.
 - VERIFY STUD GAUGE W/ PLAN SCHEDULES. NOTIFY ENGINEER IF A DISCREPANCY OCCURS.
 - SHEAR WALL CAPACITY IS BASED ON LOAD AND RESISTANCE FACTOR DESIGN (LRFD) LOADS.
 - EXP. ANCHORS SHALL BE HIT ITI KWIK BOLT 3 PER ICBO #ESR-1385.
 - ALL FRAMING SCREWS SHALL BE #10 X 5" MIN. WAFFER HEAD SELF-DRILLING SCREWS.
 - ALL PANEL EDGE SCREWS SHALL BE #10 X 1 1/4" MIN. FLAT HEAD SELF-DRILLING SCREWS WITH A MIN. HEAD DIA. OF 0.3145".
 - 22GA. SUREBOARD STRUCTURAL PANELS SHALL INCLUDE 5/8" THICK GYPSUM AND BE INSTALLED PER ICBO #ER-5762.

(2) ROWS OF (12) #10 S.M.S. EA SIDE OF SPLICE (48 TOTAL @ 18 GA) OR
 (2) ROWS OF (8) #10 S.M.S. EA SIDE OF SPLICE (24 TOTAL @ 16 GA & 14 GA)

4"x14 GAx1'-8" LONG STRAP @ 18 GA & 4"x14 GA x 1'-2" LONG STRAP @ 16 GA & 14 GA

WALL STUDS PER PLAN
 TOP TRACK
 WALL STUDS PER PLAN



A TOP TRACK SPLICE

WALL STUDS PER PLAN
 PANEL JOINT
 (2) ROWS OF SHEAR TRANSFER SCREWS PER SHEARWALL SCHEDULE

EDGE SCREWS, TYP
 ALT. SPLICE
 SUREBOARD, TYP

B SECTION AT PANEL JOINT

ATTACH TO TOP TRACK WITH SCREW PATTERN SIMILAR TO STRAP SPLICE
 LEDGER TRACK USED AS TRACK SPLICE
C ALTERNATE SPLICE

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PANEL ELEVATION

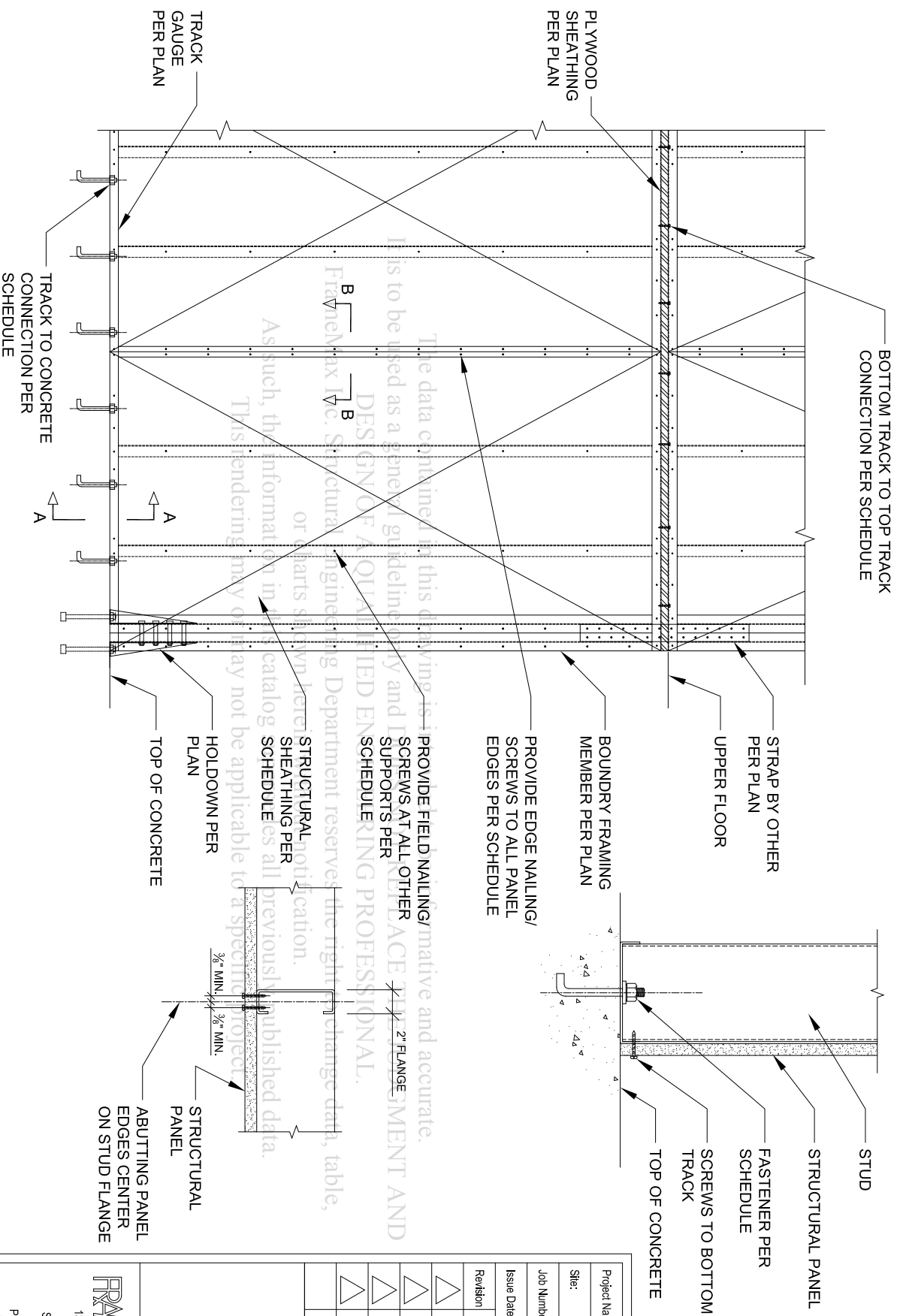
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Site:			.
Job Number:			.
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



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TYPICAL SHEARWALL PANEL TO SHEARWALL PANEL CONNECTION

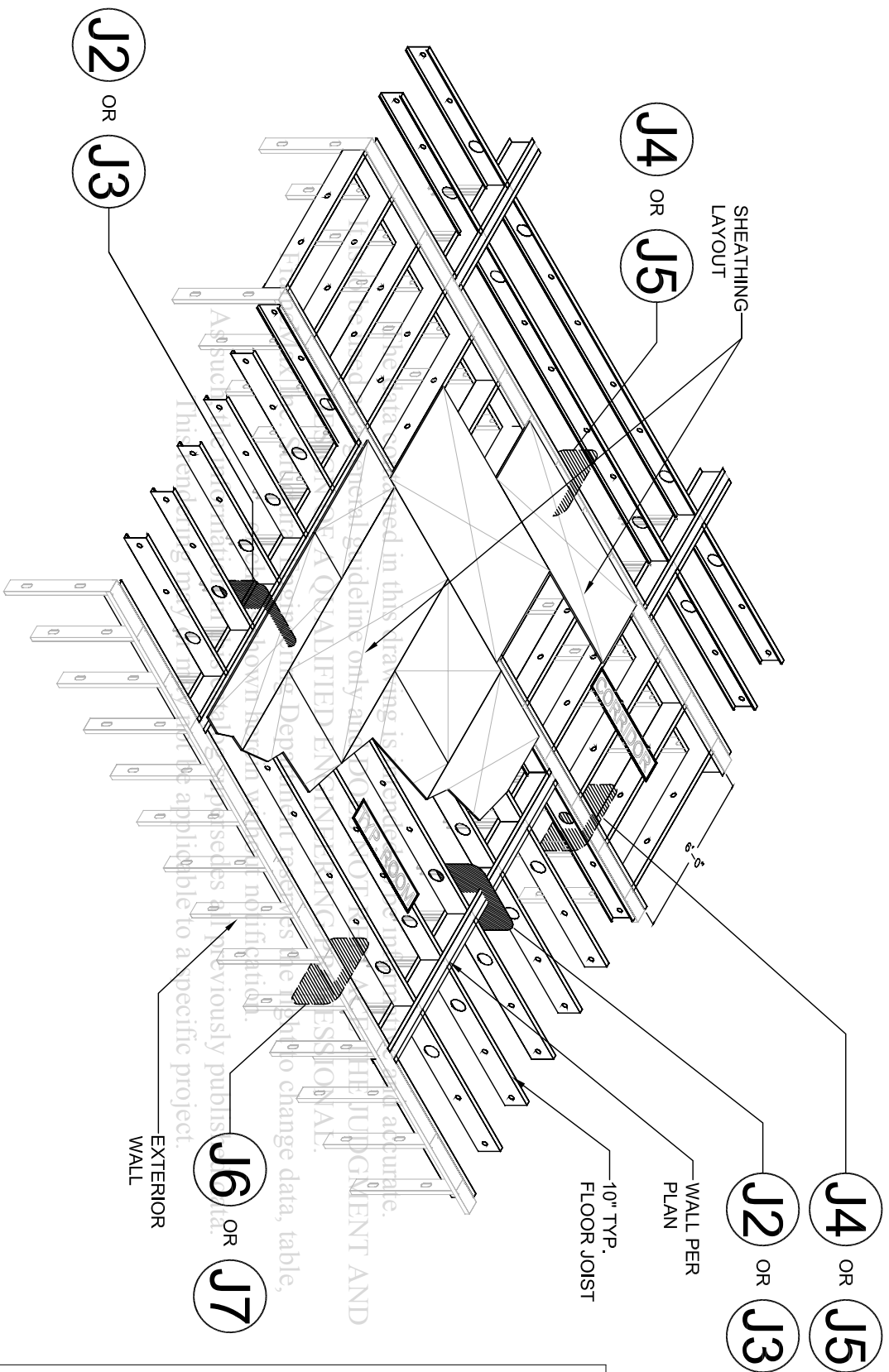
S8

SUREBOARD SHEAR WALL ELEVATION



Project Name:			.
Site:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
			
			
			
			

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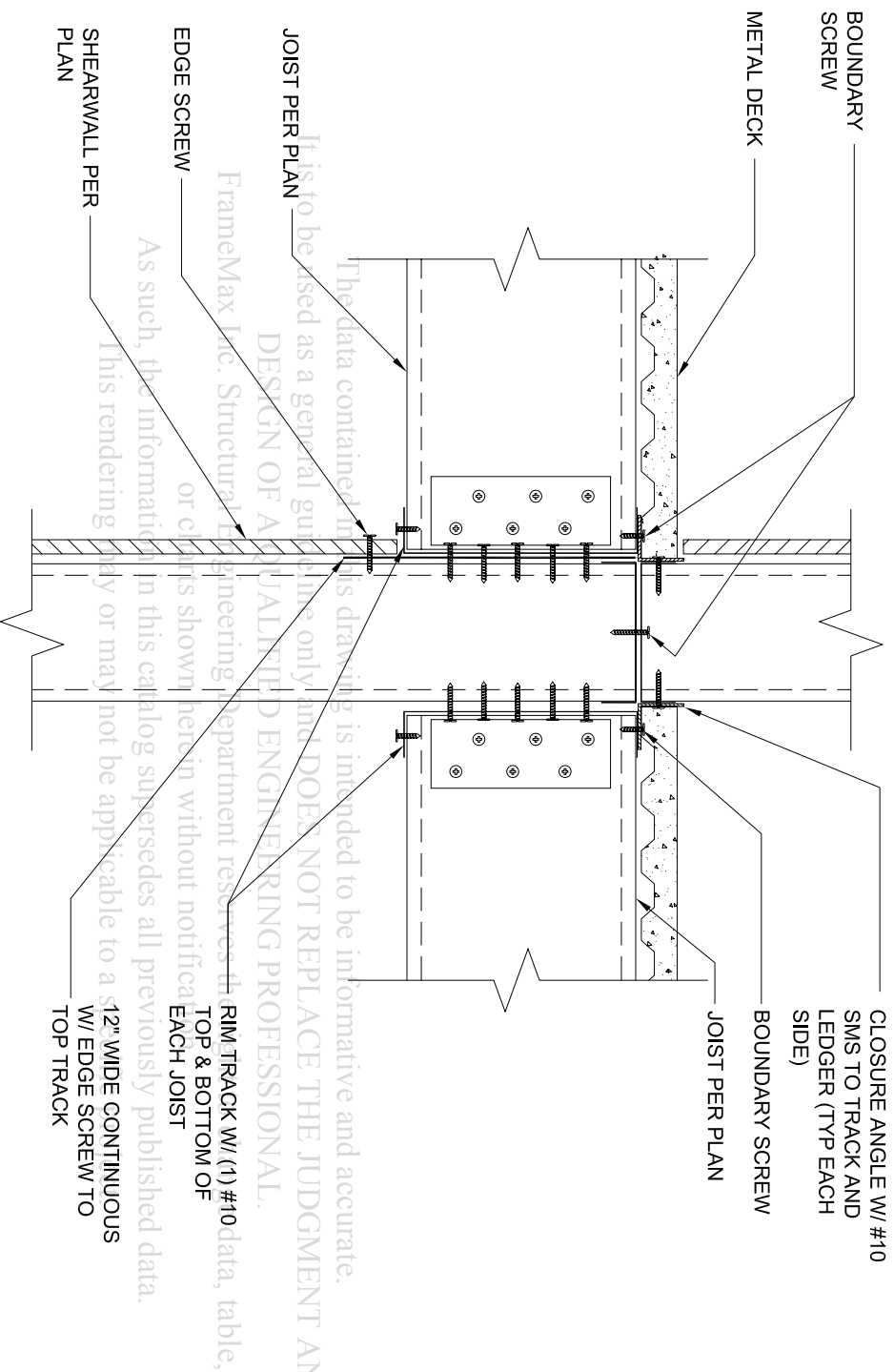
TYPICAL FLOOR JOIST FRAMING

DET_217

Project Name:		
Job Number:		
Issue Date:		
Revision	Date	Description
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J1



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JOIST CONNECTION DETAIL - METAL DECK DIAPHRAGM

DET_J22

Project Name: _____

Job Number: _____

Issue Date: _____

Revision _____ Date _____ Description _____

Revision _____ Date _____ Description _____

Revision _____ Date _____ Description _____

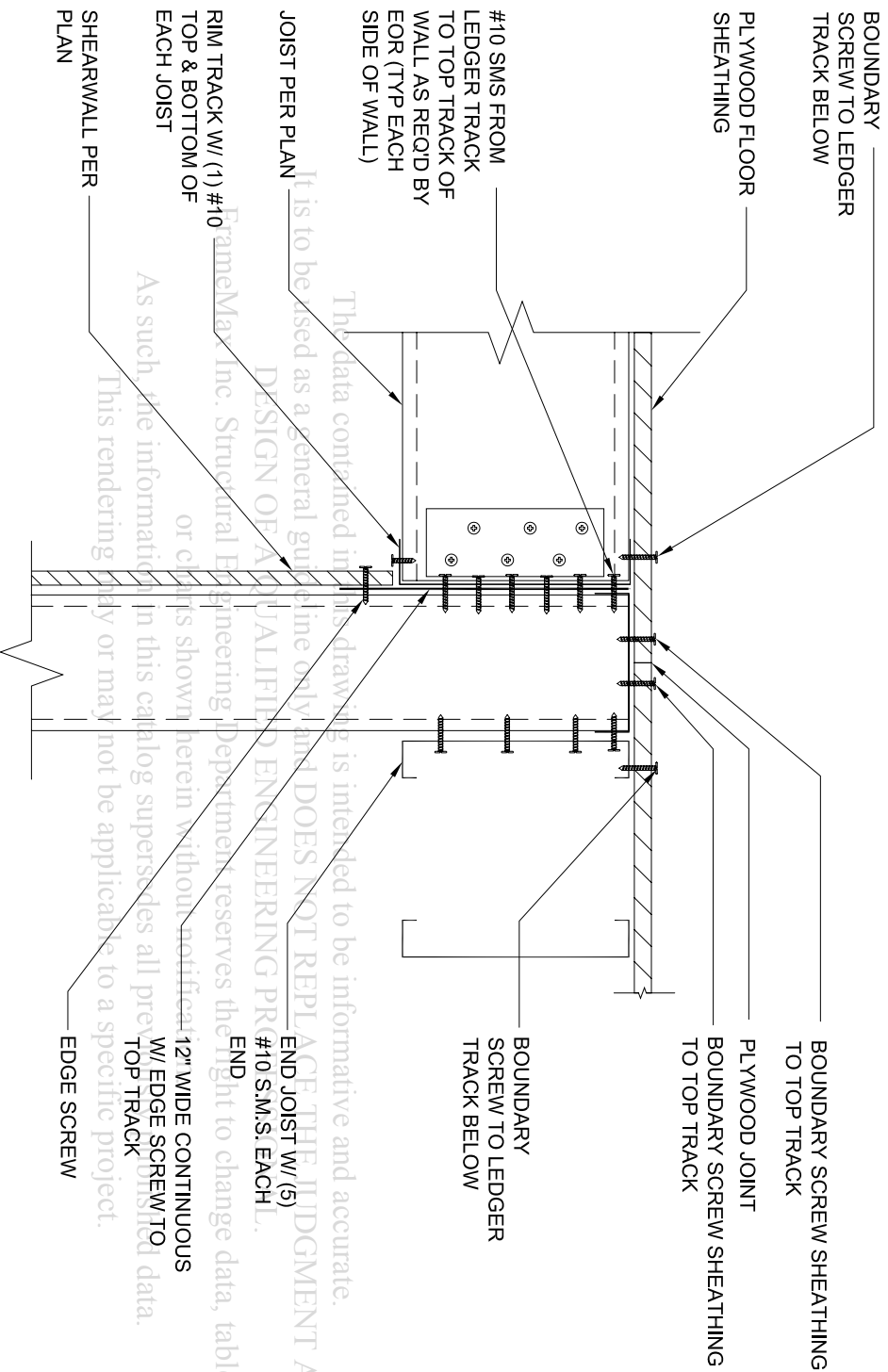
Revision _____ Date _____ Description _____

Revision _____ Date _____ Description _____

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J3



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JOIST CONNECTION DETAIL

DET_219

Project Name: _____

Job Number: _____

Issue Date: _____

Revision _____ Date _____ Description _____

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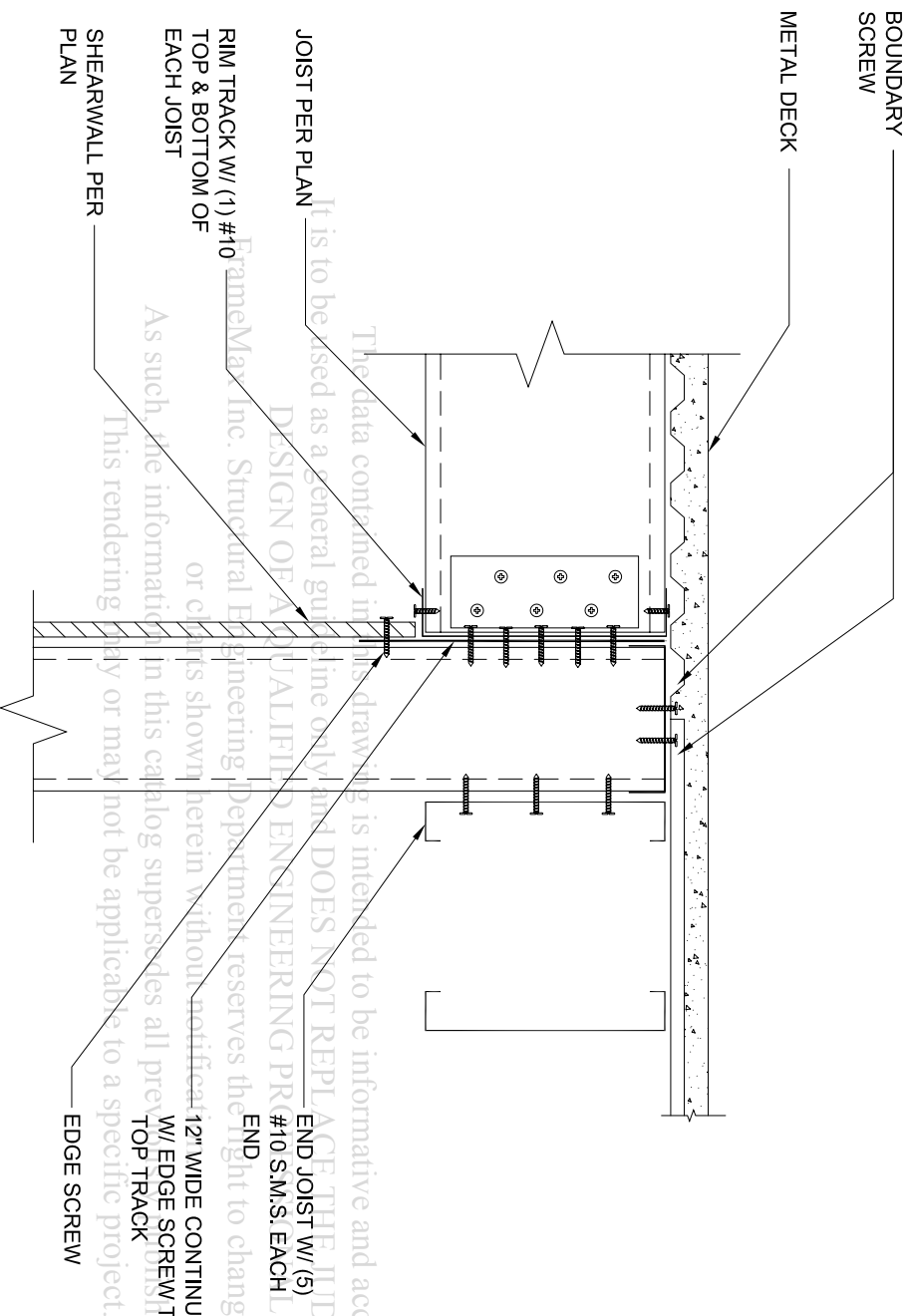
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J4

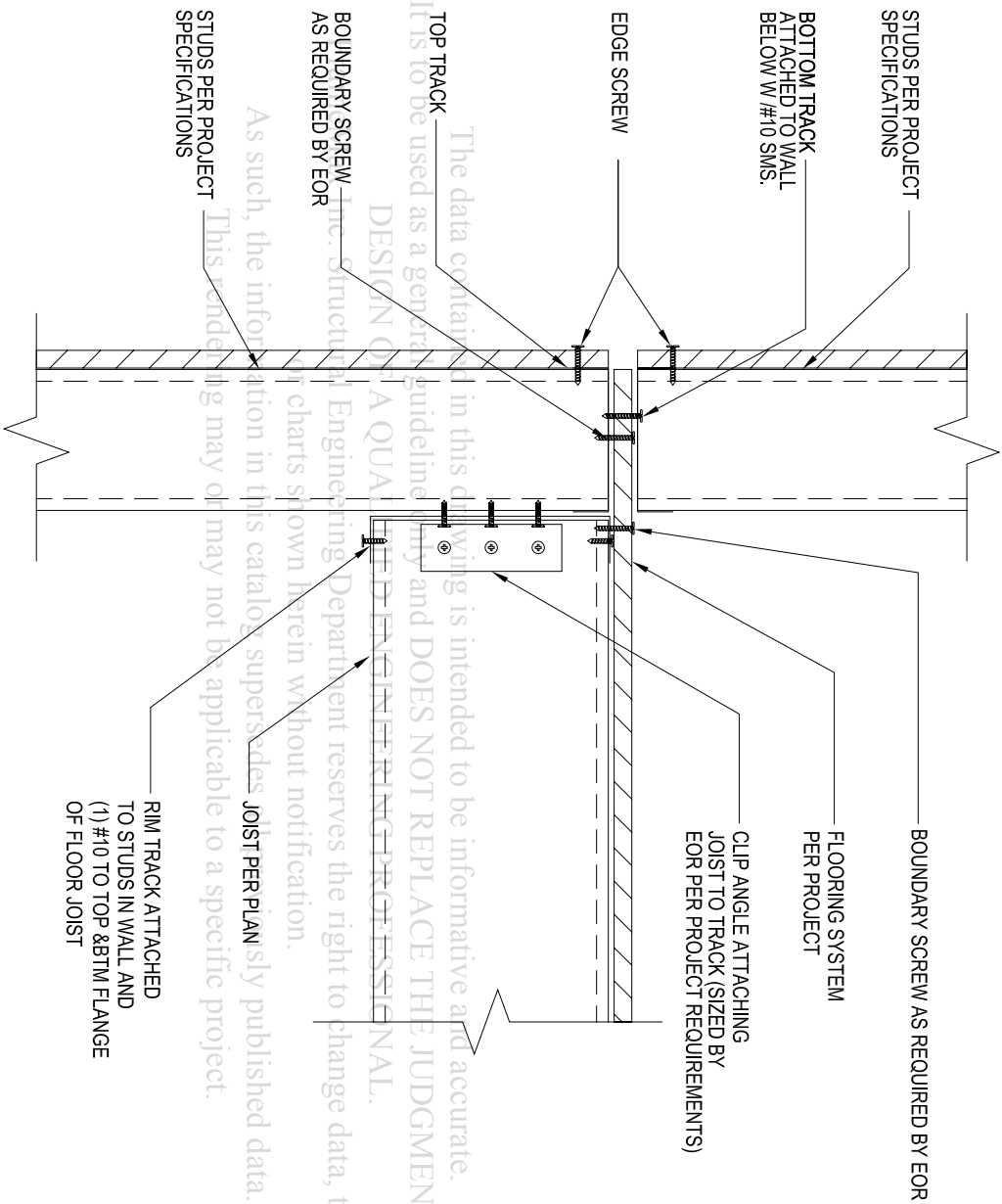


JOIST CONNECTION DETAIL - METAL DECK DIAPHRAGM @ DECK TRANSITION

DET_208

Project Name:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
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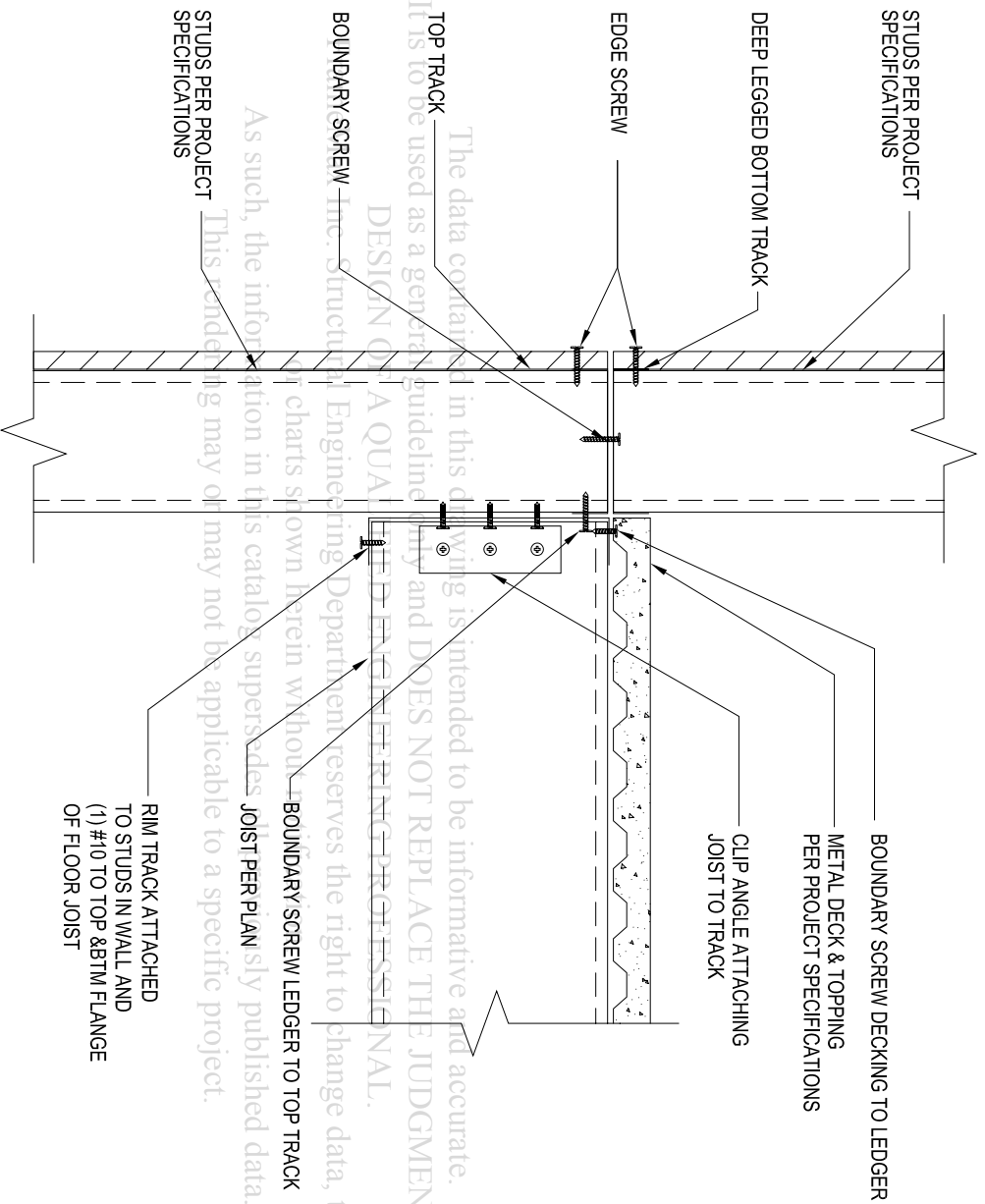
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FLOOR FRAMING SYSTEM WITH SHEARWALL SHEATHING AT EXTERIOR - PLYWOOD DIAPHRAGM

Project Name:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
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FLOOR FRAMING SYSTEM WITH SHEARWALL SHEATHING AT EXTERIOR - METAL DECK DIAPHRAGM

Project Name:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
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DEPTH OF JOIST	MAXIMUM DIAMETER OF PUNCHOUT
10"	6"
8"	5"
6"	4"

(2) #10 S.M.S. EACH ANGLE
TO STUD

33 MIL. 2" X 2" X 8" CLIP ATTACHED
TO EACH FULL HT S162-33 BLOCK
END TO JOIST WITH (2) #10 S.M.S.
PROVIDE BLOCKING AT 2 END
BAYS AND AT 10'-0" O.C.
INTERMEDIATE

FRAMEMAX FLOOR JOIST
PER PLAN

LARGE PUNCHOUT
MAXIMUM SIZE OF
PUNCHOUT PER
TABLE ABOVE

4'-6" EACH END

AS REQUIRED PER
PER FOR

2" DIAMETER PUNCH (TYP)

$$\begin{array}{c} \text{E} \\ \text{Q} \end{array} \quad \begin{array}{c} \text{E} \\ \text{Q} \end{array}$$

2'-0"

2'-0"

0.0.0.0
(Typ)

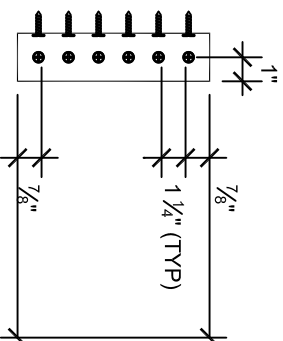
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RIM TRACK W/ (1) #10—
S.M.S. TO EACH FLANGE
OF JOIST

2" X 2" CLIP (THICKNESS -
TO MATCH JOIST
THICKNESS) W/ #10 S.M.S.
TO JOIST AND RIM TRACK
(NUMBER OF SCREWS TO
BE SPECIFIED BY EOR)



LENGTH OF CLIP = DEPTH
OF JOIST MINUS 2"

NOTES:

AT LOCATIONS WHERE BLOCKING STUD IS PENETRATED PROVIDE A FLAT TRACK ABOVE & BELOW THE BLOCKING STUD. TRIM FLANGES AS REQUIRED AND ATTACH TO JOIST ON EITHER SIDE W/ (2) #10 S.M.S.

Project Name:		
Job Number:		
Issue Date:		
Revision	Date	Description
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TYPICAL FLOOR JOIST PROFILE (4" MIN DEPTH)



FramelMax Floor Joist Substitution

Date
Project Name

Input Date
Input Project Name

Input Engineer of Record
Input Contact

Page reference on Calculations
Joist Section per Calculations

N/A
1200SS200-54

FramelMax Joist Substitution

FM 1000S 162 - 68
w/ 6 in. max. punchouts (see attached AISIWIN v7.0 output to follow)

Joist Depth =	10.00 in	radius of corners =	0.06 in
Flange Width =	1.625 in	h/t =	139
Mill Thickness =	68 mil	E =	29000 ksi

(Properties reflect most critical values as calculated below and within AISI Output)

$S_{e\text{xx}}$ =	2.1485 in ³	>	1.90 in ³	OK	89% Capacity
$I_{e\text{xx}}$ =	11.9212 in ⁴	>	7.420 in ⁴	OK	62% Capacity
A_{web} =	1.4089 in ²	>	0.207 in ²	OK	15% Capacity

Section Modulus Required (based on net section)

Deflection Requirements
Deflection, Δ , = $5w_l^4 / 384 EI$

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W_{dl} =	80 psf	Maximum Allowed Deflection =	N/A in	OK
W_{ll} =	40 psf			
W_u =	120 psf			

Spacing of Joists = 2 ft

distributed load, total = 120 pcf
distributed load, live = 80 pcf
span of joist = 12.583 ft

Total Load Deflection Allowance =	L/240	OK
Live Load Deflection Allowance =	L/360	OK

Moment, M_a = 4749.96 # ft

Moment of Inertia Required =	7.420 in ⁴	OK
------------------------------	-----------------------	----

$M_a = M_n / \Omega_b$

where, Ω_b = 1.67

therefore, $M_n = M_a \times \Omega_b$ = 7932 # ft

F_y = 50 ksi

50000 psi

$M_n = S_e F_y$

therefore, $S_{req'd} = M_n / F_y$

$S_{req'd} = 1.90 \text{ in}^3$

Per C3.3.1 - Interaction Equation =	88.66%	OK
-------------------------------------	--------	----

Shear Strength (Resistance) of C-Section Webs with Holes - C3.2.2

- (1) do / h <= 0.7
- (2) h / t <= 200
- (3) Holes Centered at mid-depth of web
- (4) Clear distance between holes >= 18 in.
- (5) Non-circular holes, corner radii >= 2t
- (6) Non-circular holes, do <= 2.5 in and b <= 4.5 in.
- (7) Circular holes, diameter <= 6 in.
- (8) do > 9/16 in.

Per C3.2.1:

$$h/t \geq 1.51 (E_k v / F_y)^{1/2}$$

therefore, $F_v = 0.60 (E_k v / F_y) / (h/t)$

Per C3.2.2:

$$c = h/t - d_o/2.83 = 136.45$$

$$c/t = 1913.73$$

Value	
0.61	OK
139	OK
Yes	OK
20 in	OK
N/A	OK
N/A	OK
6 in	OK
6 in	OK

$$k_v = 5.34$$

$$(E_k v / F_y)^{1/2} = 55.65$$

$$1.50 \times (E_k v / F_y)^{1/2} = 83.48$$

$$c/t \geq 54, \text{ hence, } q_s = 1.0$$

$$F_v = 7.291 \text{ ksi}$$

$$V_n = q_s A_w F_v = -0.062 \text{ k}$$

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$$A_{req'd} = V / f_v = 0.207 \text{ in}^2$$

$$V_n / \phi_v = -0.039 \text{ k}$$

Large Perforation Located 24 inches from end of span

$$\text{Size of Punchout} = 6 \text{ in}$$

$$\text{location of perforation (from end of span)} = 24 \text{ in}$$

$$\text{Shear Value at center of perforation} = 1029.96 \text{ \#}$$

$$F_v = 7.291 \text{ ksi}$$

$$A_{req'd} = V / F_v = 0.141 \text{ in}^2$$

$$A_{provided} \text{ at punchout} = 0.277 \text{ in}^2$$

OK

$$\text{Moment at perforation, } M_a = 2539.92 \text{ \# ft}$$

$$\text{therefore, } M_n = M_a \times \Omega_b = 4242 \text{ \# ft}$$

$$M_n = S_e F_y = 50900 \text{ \# in}$$

$$\text{therefore, } S_{e req'd} = M_n / F_y$$

$$S_{req'd} \text{ at perforation} = 1.02 \text{ in}^3$$

$$S_{e provided} \text{ at punchout} = 2.15 \text{ in}^3$$

re: output from AISI Calculation

OK

Small Perforation Located at Midspan

$$\text{Size of Punchout} = 2 \text{ in}$$

$$\text{location of perforation (from end of span)} = 75.498 \text{ in}$$

$$\text{Shear Value at center of perforation} = 0 \text{ \#}$$

$$F_v = 7.291 \text{ ksi}$$

$$A_{req'd} = V / F_v = 0.000 \text{ in}^2$$

$$A_{provided} \text{ at punchout} = 0.562 \text{ in}^2$$

OK

$$\text{Moment at perforation, } M_a = 4749.96 \text{ \# ft}$$

$$\text{therefore, } M_n = M_a \times \Omega_b = 7932 \text{ \# ft}$$

$$M_n = S_e F_y = 95189 \text{ \# in}$$

$$\text{therefore, } S_{e req'd} = M_n / F_y$$

$$S_{req'd} \text{ at perforation} = 1.90 \text{ in}^3$$

$$S_{e provided} \text{ at punchout} = 2.15 \text{ in}^3$$

re: output from AISI Calculation

OK

C3.3.1 Combined Bending and Shear (ASD Method)

$$\left[\frac{\Omega_b M}{M_{nxo}} \right]^2 + \left[\frac{\Omega_v V}{V_n} \right]^2 \leq 1.0$$

= 0.79 + 0.10 = 0.89

OK

$$\frac{\Omega_b M}{M_{nxo}} = 0.89$$

> 0.50

OK

$$\frac{\Omega_v V}{V_n} = 0.16$$

< 0.70

OK

with, $M_{max} = 4749.96 \text{ # ft}$

$\Omega_b = 1.67$

$M_{nxo} = F_y \times S_e$

$F_y = 50000 \text{ psi}$

$S_e = 2.1485 \text{ in}^3$

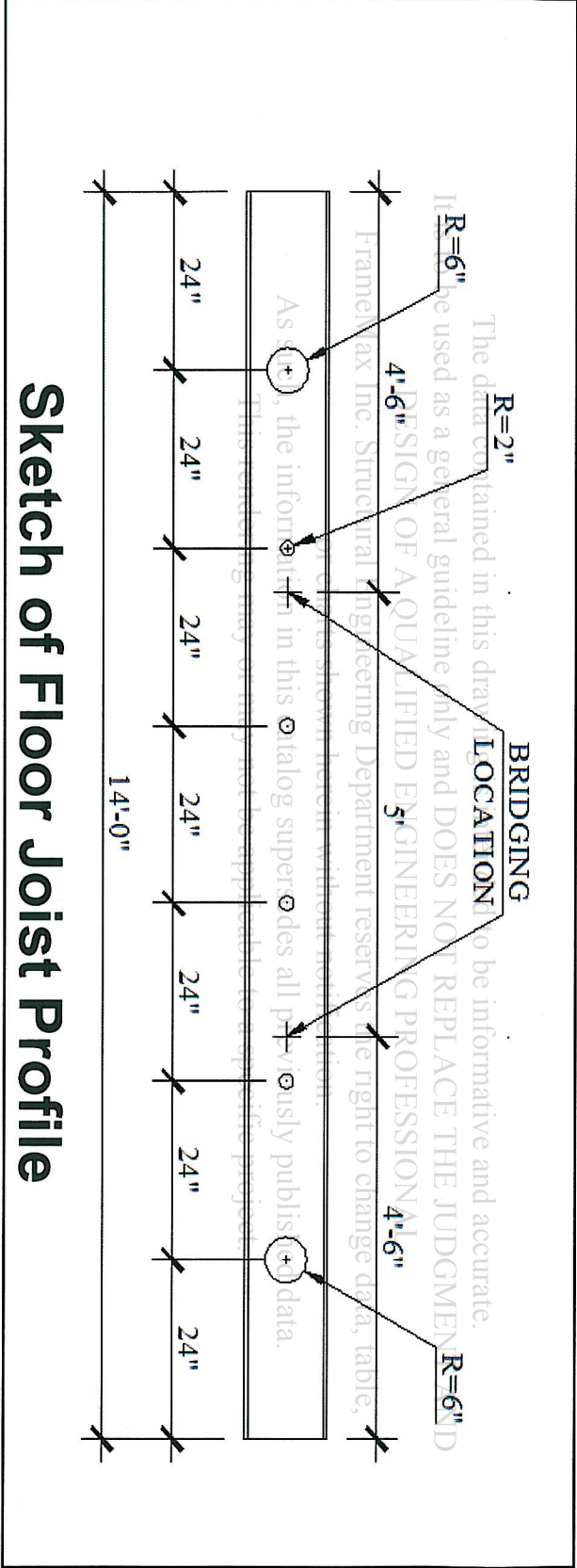
and, $V_{max} = 1029.96 \text{ #}$

$\Omega_v = 1.60$

$V_n = F_v \times A$

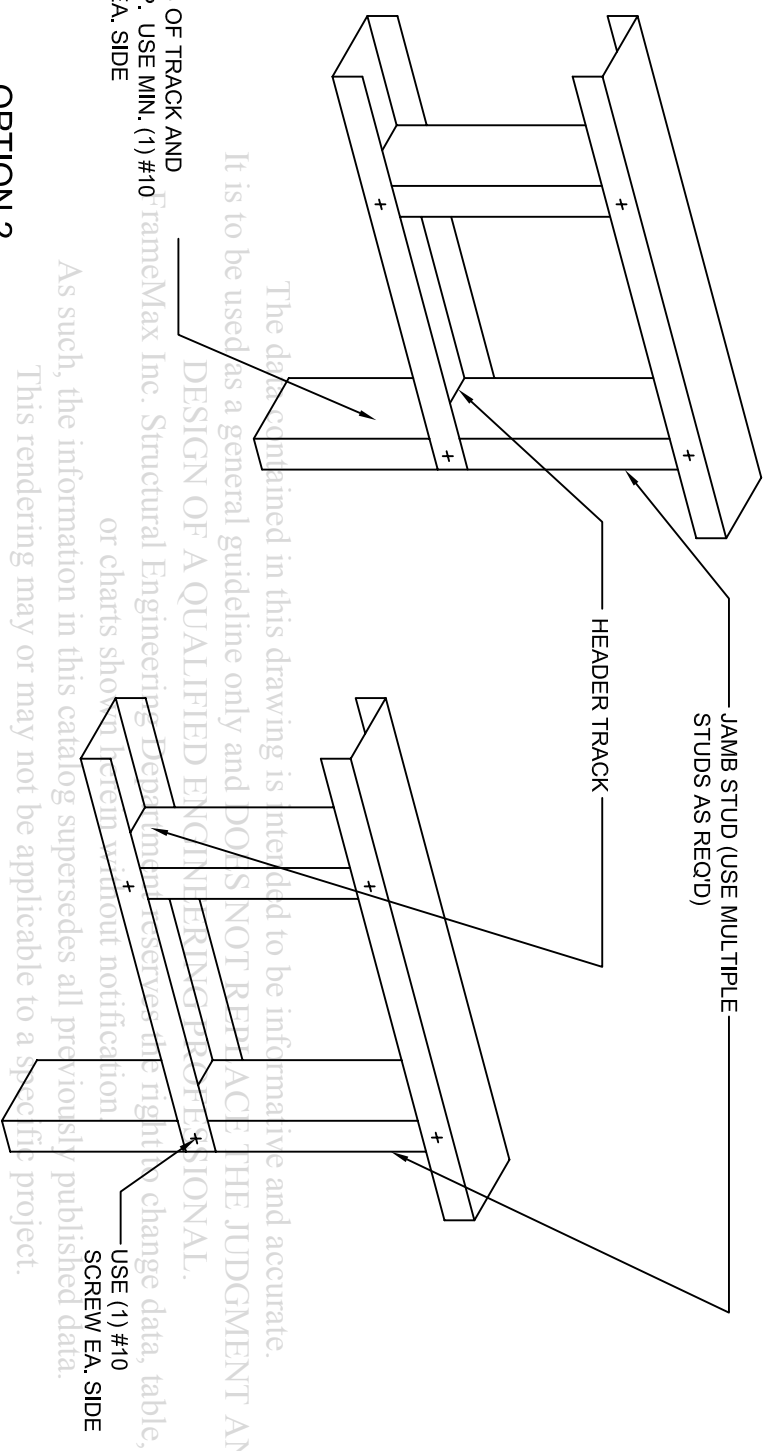
$F_v = 7290.76 \text{ psi}$

$A = 1.409 \text{ in}^2$



The preceding calculations are an example. FrameMax, Inc. expressly disclaims any responsibility or liability for the accuracy of the information, the appropriateness of the calculations for any specific use, or fitness for a particular purpose. The party to whom this information is conveyed acknowledges and agrees that the recipient has no right to rely upon such information. The engineer-of-record should review the conditions assumed above and determine if they meet the design criteria for the project.

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OPTION 2

OPTION 1

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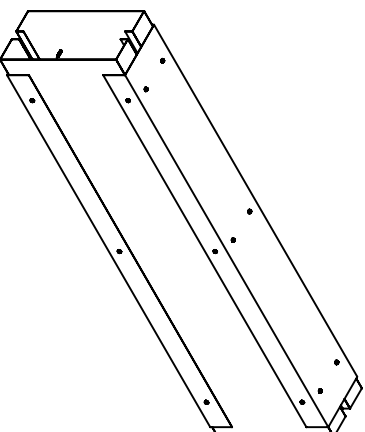
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Job Number:			.
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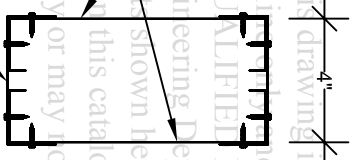
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STANDARD HEAD FOR NON-BRG INTERIOR WALL

H1



(4) #10 S.M.S. @
12" O.C. - TRACK TO
JOIST TYPE.



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BOX BEAM FRAMING

DET_047

Project Name:	.	
Site:	.	
Job Number:	.	
Issue Date:	.	
Revision	Date	Description

△	
△	
△	
△	

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H2

TOP TRACK FLANGE
NOTCHED AND RUN ON
TOP OF BEAM
-ALTERNATE
IF REQUIRED, TRACK
MAY BE STOPPED AND
STRAPPED TOGETHER
PER REQUIREMENT
OF EOR

(2) #10 SCREWS TO
DROPPED BEAM

BOTTOM POCKET BEAM
CAP TRACK, NOTCH WEB
SCREW TO BOTH SIDE OF
STUDS

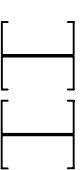
(3) #10 SCREWS EACH
SIDE PER PLAN

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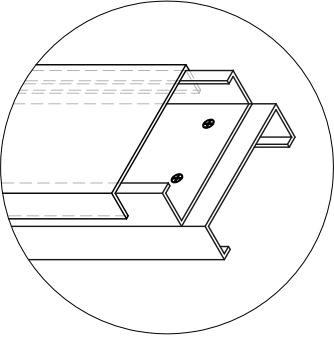
COLUMN PER PLAN



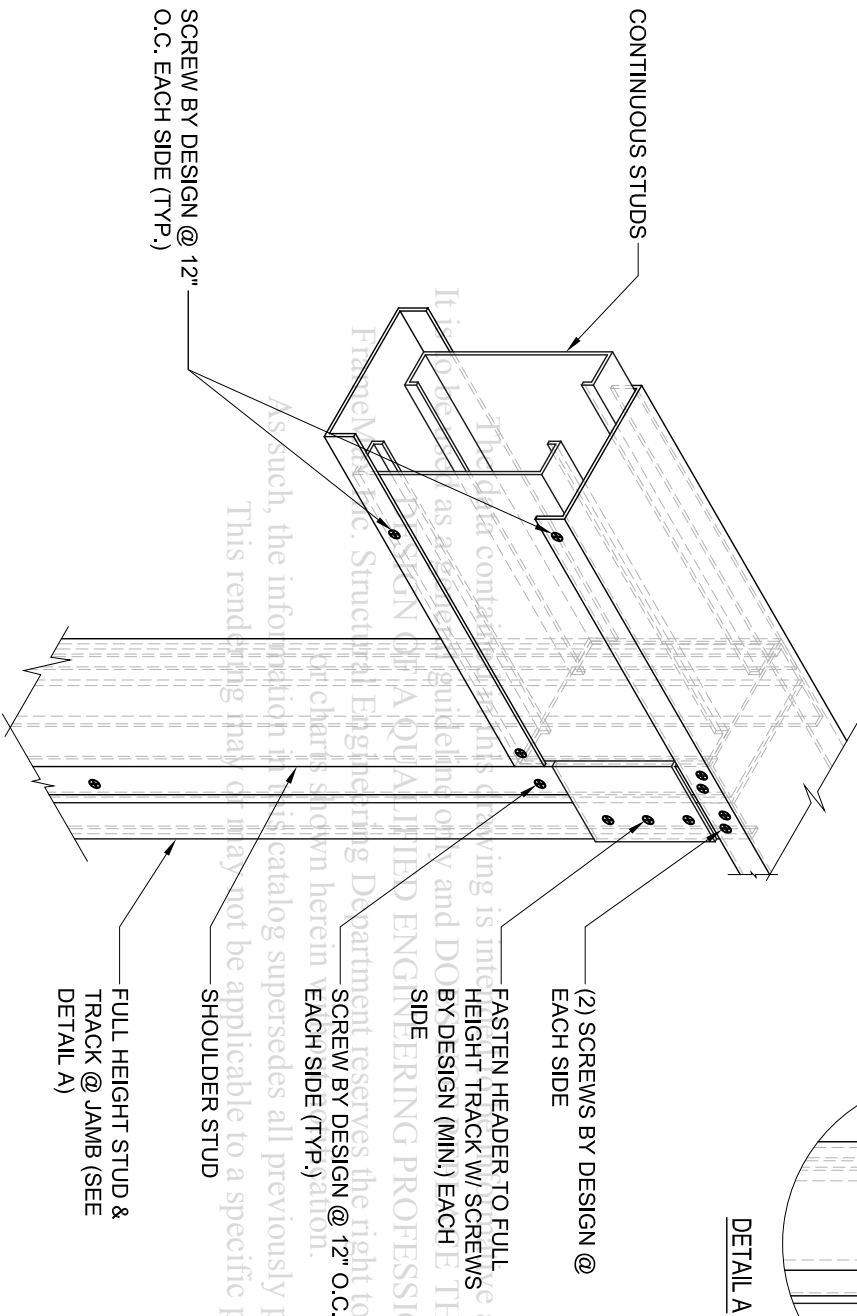
TYPICAL POCKET BEAM AT LOAD BEARING WALL

Project Name:			.
Site:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
△			
△			
△			
△			

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DETAIL A



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Project Name:			.
Site:			.
Job Number:			.
Issue Date:			.
Revision	Date	Description	
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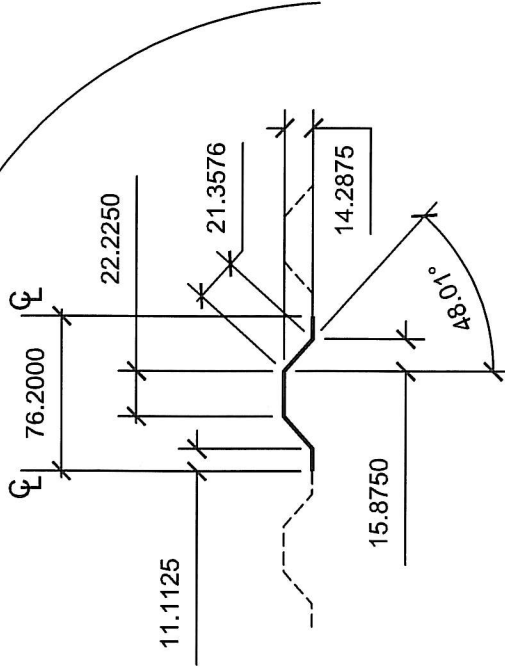
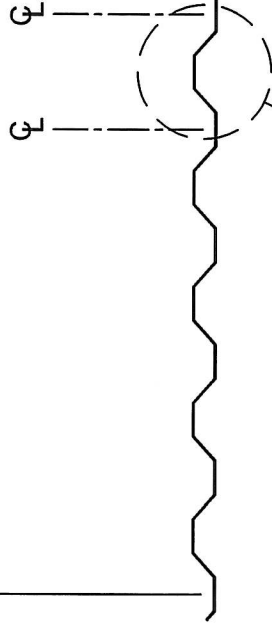


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HEADER @ BEARING WALL

H4

914.4000



NOTES:
1. ALL UNITS ARE IN MILLIMETERS
2. THICKNESS OF MAT'L = 0.719 MM

TYPICAL SECTION

Project Name:			
Job Number:			
Issue Date:			
Revision	Date	Description	
△			
△			
△			
△			

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TYPICAL METAL FLOOR DECK PROFILE

FD1

SDI Diaphragm Shear Capacity

Reference: SDI Diaphragm Design Manual, Third Edition

Panel Properties

Profile:	9/16" Shallow Floor Deck	
Thickness:	22 gauge	27 Mils

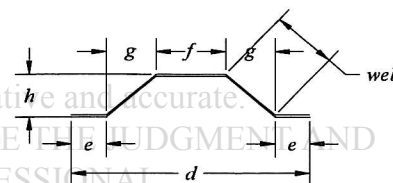
t	0.0283	in	Base Sheet Metal Thickness
I	0.0255	in ⁴ / ft	Panel Moment of Inertia
F _y	50	ksi	Yield Strength
F _u	65	ksi	Tensile Strength
E	29500	ksi	Modulus of Elasticity

Span Data

L _v	2	ft	Purlin Spacing
Spans	8		Number of spans per panel
L	16	ft	Panel Length [L = Spans x L _v]
n _p	7		Number of Purlins excluding those at ends or end laps where Connection patterns may differ [n _p = Spans - 1]
a	6		Number of Sidelap (or parallel support) fasteners per span

Panel Geometry (Fig 2.3-1)

h	0.5625	in	Panel Depth
w	36	in	Panel Width
f	0.875	in	Top Flange Width [e = f/2]
e	0.4375	in	Bottom Flange Width
2 x e	0.875		
g	0.625	in	Horizontal run of Web
w _{eb}	0.841	in	Web Length [w _{eb} = (g ² + h ²) ^{0.5}]
p	3	in	Pitch Spacing
d	3	in	panel corrugation pitch [d = p]
n	12		Number of Ribs [n = w / p]
s	3.432	in	Developed flute width per width [s = 2 x (e + web) + f]

Support AttachmentsAttachment Type: #12 Buildex Screws
Attachment Pattern: 36/4

A	1		Single Fastener at Panel Edges (page 2-7)
n _f	13		Number of Support Attachments per Sheet
N = (n _f / w) x 12	4.333		Number of Support Attachments per Foot of Width
n _e = Spans x a	48		Number of Edge Attachments in Panel Length
Q _f (Eq. 4.5-1)	1.3265625	kip	Support Connector Strength for #12 screws (at Perpendicular and Parallel Supports U.N.O.) [Q _f = 1.25 x F _y x t x (1-0.005 x F _y)]
S _f (Eq. 4.5.1-1)	0.0077	in / kip	Support Connector Flexibility for #12 screws (at Perpendicular and Parallel Supports U.N.O.) [S _f = 1.3 / 1000 x (t) ^{0.5}]

x_e	18 in	distance from panel centerline to any fastener in a panel at the end support
	15 in	
	12 in	
	9 in	
	6 in	
	3 in	
	0 in	
	3 in	
	6 in	
	9 in	
	12 in	
	15 in	
	18 in	

x_e^2	324 in ²	
	225 in ²	
	144 in ²	
	81 in ²	
	36 in ²	
	9 in ²	
	0 in ²	
	9 in ²	
	36 in ²	
	81 in ²	
	144 in ²	
	225 in ²	
	324 in ²	

$$\Sigma x_e = 126 \text{ in}$$

$$\Sigma x_e^2 = 1638 \text{ in}^2$$

$$\alpha_1 = \Sigma x_e / w$$

$$3.500$$

End Distribution Factor with summation across the full width, w

$$x_p = x_e$$

distance from panel centerline to any fastener
in a panel at the purlins

$$\Sigma x_p = \Sigma x_e = 126 \text{ in}$$

$$\Sigma x_p^2 = \Sigma x_e^2 = 1638 \text{ in}^2$$

$$\alpha_2 = \alpha_1$$

$$3.500$$

Purlin Distribution Factor similar to α_1

$$\alpha_2 = \Sigma x_p / w$$

Sidelap AttachmentsAttachment Type: #10 Buildex Screws
Attachment Spacing: 1 / Span

$$n_s = a \times \text{Spans}$$

$$48$$

Number of sidelap fasteners in panel length L

$$Q_s$$

$$0.6085 \text{ kip}$$

Sidelap fastener strength for #10 screws
 $Q_s = 21.5 \times t$

$$S_s$$

$$0.0178 \text{ in / kip}$$

Sidelap Fastener Stiffness for #10 screws
 $S_s = 3 / 1000 (t)^{0.5}$ **Determine Nominal Diaphragm Shear Strength**Edge Fasteners Limitations - Eq. 2.2-2 (DDM03)

$$S_{ne}$$

$$6.5914 \text{ kip}$$

Nominal Shear Strength

$$S_{ne} = (2 \times \alpha_1 + n_p \times \alpha_2 + n_e) \times (Q_f / L)$$

Interior Panel Fastener Limitations - Eq. 2.2-4 (DDM03)

S_{ni}	3.7069 kip	Nominal Shear Strength
		$S_{ni} = (2 \times A [\lambda - 1] + B) \times Q_f / L$
where, $\lambda =$	0.9721	$\lambda = 1 - (h \times L_v) / [240 \times (t)^{0.5}]$
$\alpha_s =$	0.4587	$\alpha_s = Q_s / Q_f$
$B =$	44.7660	$B = n_s \times \alpha_s + (2 \times n_p \times \Sigma x_p^2 + 4 \times \Sigma x_e^2) / W^2$

Corner Fastener Limitations - Eq. 2.2-5 (DDM03)

S_{nc}	3.118 kip	Nominal Shear Strength
		$S_{nc} = (N^2 \times B^2 / L^2 \times N^2 + B^2)^{0.5} \times Q_f$

Stability Limitations - Eq 2.3-3 (DDM03)

S_{nb}	3.459 k / ft	Nominal Shear Strength
		$S_{nb} = 3250 / L_v^2 \times [(t^3 \times t^3 \times (d/s))^{0.25}]$

Determine Allowable (ASD) Diaphragm Shear Strength

AISI / IBC Safety Factors (Table 2.1)

Ω_{dc}	2.50	ASD safety factor based on connection & load type (2.5 used as conservative)
---------------	-------------	---

Ω_{db}	2.50	ASD safety factor based on buckling
---------------	-------------	-------------------------------------

Fastener Strength [2.5(a)]

$S_{fastener}$	1.247 kip	Shear Strength
----------------	-----------	----------------

$$S_{fastener} = \min(S_{ne}, S_{ni}, S_{nc}) / \Omega_{dc}$$

Shear Buckling [2.5(b)]

$S_{buckling}$	1.384 kip	Shear Strength
----------------	-----------	----------------

$$S_{buckling} = S_o / \Omega_{db}$$

Allowable Strength

S_{AISI}	1.247 kip	$S_{AISI} = \min(S_{fastener}, S_{buckling})$
------------	------------------	---

Determine Diaphragm Stiffness and Flexibility Factors

Warping factor development, determined in accordance with Appendix IV - 4 & 5 of SDI DDM03.

Warping Constant, D:	Each Flute	DW1 =	22.082
	Every Other Flute	DW2 =	521.707
	Every Third Flute	DW3 =	1109.783
	Every Fourth Flute	DW4 =	1793.343

Slip Coefficient - Eq 3.3-1 (DDM03)

C	0.941	Slip Coefficient
		$C = Et/W \times S_f (12 \times 2L / (2\alpha_1 + n_p \alpha_2 + 2n_s(S_f/S_o)))$

ρ	0.900	Table 3.3-2 (Span of 4)
--------	--------------	----------------------------

Warping Coefficients - Eq 3.3-2 (DDM03)

D_n	9.340	Warping Coefficient
		$D_n = D_{warp} / L$ where $D_{warp} = DW4$

Stiffness Factor - Eq 3.3-3 (DDM03)

$G' = 67.754 \text{ kip / in}$ Stiffness
 $G' = Et / (2.6s/d + \rho D_n + C)$

$F = 14.759 \text{ in / lb}_f$

Allowable Diaphragm Shear Capacity, q (plf)							
9/16" Shallow Floor Deck Material, 50 ksi							
2'-0" Spans - 8 Span Sheets (16' sheet length) - $\Omega = 2.5$							
Deck Gage	Number of Sidelap Connections Per Span	Support Attachment Pattern 36/13		6 Sidelap Screws per Span			
		q (plf)	F	# of Spans	Length	q (plf)	F
22	0	717	16.2	2 Span	4'	1384	44.825
	1	819	15.8	4 Span	8'	1296	24.777
	2	915	15.4	6 Span	12'	1264	18.098
	3	1007	15.2	8 Span	16'	1247	14.759
	4	1092	15.0	10 Span	20'	1237	12.756
	5	1172	14.9	15 Span	30'	1224	10.086
	6	1247	14.8				
	7	1317	14.7				
	8	1381	14.6				

The preceding calculations are an example. FrameMax, Inc. expressly disclaims any responsibility or liability for the accuracy of the information, the appropriateness of the calculations for any specific use, or fitness for a particular purpose. The party to whom this information is conveyed acknowledges and agrees that the recipient has no right to rely upon such information. The engineer-of-record should review the conditions assumed above and determine if they meet the design criteria for the project.

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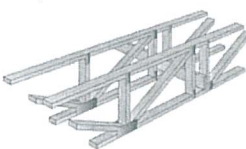
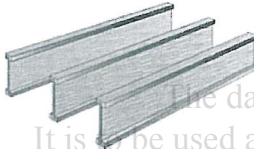
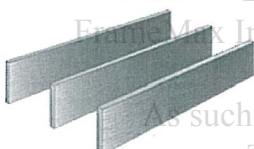
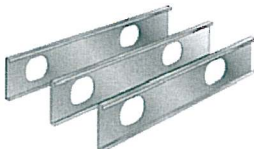
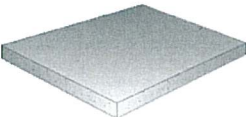
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Design

for Fire and Sound

1 Hour rated

Floor System	UL Number	Sound Mat	LEVELROCK Floor Underlayment ^a	Insulation	Truss Depth	RC-1 Channel	SHEETROCK FIRECODE C CORE Ceiling Assembly	Floor Covering	Sound Rating		Test Number	
									STC	IIC	STC	IIC
Open Web Wood Joist 	L521	None	3/4"	3 1/2" batt	18"	16" o.c.	1 layer 5/8"	vinyl	58	48	RAL-TL-97-340	RAL-IN-97-47
								carpet & pad	76			RAL-IN-97-48
	L528	None	3/4"	none	12"	16" o.c.	1 layer 5/8"	carpet & pad	53	60	RAL-TL-04-321	RAL-IN-04-019
	L521	SRM-25	1"	3 1/2" batt	12"	16" o.c.	1 layer 5/8"	vinyl	62	53	RAL-OT-04-01	RAL-OT-04-02
								cushioned vinyl	62	55	RAL-OT-04-03	RAL-OT-04-04
								carpet & pad	62	81	RAL-OT-04-05	RAL-OT-04-06
								wood laminate	61	55	RAL-OT-04-07	RAL-OT-04-08
Engineered Wood I-Joist 	L570	SRB	3/4"	3 1/2" batt	9 1/2"	16" o.c.	2 layer 1/2"	wood laminate	65	61	RAL-OT-02-03	RAL-OT-02-04
								vinyl	65	54	RAL-OT-03-01	RAL-OT-03-02
								ceramic tile ^e	66	51	RAL-OT-03-03	RAL-OT-03-04
	L570	SRM-25	1"	3 1/2" batt	9 1/2"	16" o.c.	2 layer 1/2"	none	65	52	USG-00302 ^c	USG-00302 ^c
								vinyl	64	58	RAL-OT-03-05	RAL-OT-03-06
								wood laminate	64	62	RAL-OT-03-07	RAL-OT-03-08
								ceramic tile	66	54	RAL-OT-03-09	RAL-OT-03-10
2" x 10" Wood Joist 	L569	none	none	3 1/2" batt	10"	16" o.c.	1 layer 5/8"	none	51	41	RAL-TL-99-047	RAL-IN-99-005
	L569	SRM-25	1"	3 1/2" batt	10"	16" o.c.	1 layer 5/8"	vinyl	58	51	RAL-TL-04-031	RAL-IN-04-004
								cushioned vinyl	59	54	RAL-TL-04-033	RAL-IN-04-006
								carpet & pad	59	77	RAL-TL-04-032	RAL-IN-04-005
								wood laminate	58	55	RAL-TL-04-034	RAL-IN-04-007
								ceramic tile ^e	59	52	RAL-TL-04-067	RAL-IN-04-009
	L569	SRB	3/4"	3 1/2" batt	10"	16" o.c.	1 layer 5/8"	cushioned vinyl	58	50	RAL-TL-04-100	RAL-IN-04-013
Steel Joist^d 								carpet & pad	58	73	RAL-TL-04-097	RAL-IN-04-010
								wood laminate	58	51	RAL-TL-04-099	RAL-IN-04-012
	G551	SRM-25	1"	3 1/2" batt	9 1/4"	none	1 layer 5/8"	vinyl	64	55	RAL-OT-05-007	RAL-OT-05-008
								carpet & pad	63	81	RAL-OT-05-009	RAL-OT-05-010
								wood laminate	63	58	RAL-OT-05-011	RAL-OT-05-012
								ceramic tile	65	51	RAL-OT-05-015	RAL-OT-05-016
6" Concrete 	D900 ^b	SRM-25	1"	none	6"	none	none	vinyl	56	49	RAL-TL-03-176	RAL-IN-03-006
								wood laminate	54	50	RAL-TL-03-177	RAL-IN-03-007
								ceramic tile ^e	56	51	RAL-TL-03-210	RAL-IN-03-010
	D900 ^b	SRM-25	1"	none	6"	none	none	carpet & pad		77		RAL-IN-03-009
								none		50		RAL-IN-03-008
	D900 ^b	none	none	none	6"	none	none	none	26			RAL-IN-00-RD22

Note

(a) LEVELROCK floor underlayments have been tested with other sound mats. Contact USG for details.

(b) D900 refers to a series of concrete fire-rated systems. 6" concrete at 135 lbs./cu. ft. can provide a 2-hour rating. Please refer to the UL Directory for additional information.

(c) Test completed for baseline reference only.

(d) Tested with TRADEREADY[®] steel joist.

(e) Requires crack isolation membrane.



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August 18, 2006

Mr. Jerry Lewis
USG Corporation
700 N. Highway 45
Libertyville, IL 60048

Our Ref: File R5698, Project 06NK20285, P.O.# 31-422
Subject: Cal Poly, San Luis Obispo, CA

Dear Mr. Lewis:

This is to confirm our telephone conversation of this morning with Mr. Nestor Sanchez relative to fire resistance rating of a floor-ceiling assembly to be constructed at the above-mentioned project.

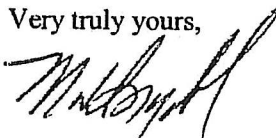
We understand that the assembly would be similar to that described in Design No. G551 except that unclassified steel joists would be used. The joists would also be channel-shaped, minimum 9-1/4" deep with 1-3/4 in. flanges, fabricated from minimum 16 gauge steel, spaced a maximum of 24 in. OC.

All other details of the assembly would be in accordance with the specifications set forth in Design No. G551 for the 1-hr rating, including the UL Classified LEVELROCK[®] floor topping mixture (minimum 1 in. thickness measured from the top plane of the the corrugated deck), the 9/16 in. deep, minimum 22 gauge corrugated steel deck, 1/2 in. deep resilient channels at maximum 12 in. OC, glass fiber insulation in the concealed space and the UL Classified 5/8 in. SHEETROCK[®] Brand Gypsum Panels, FIRECODE[®] C Core (UL designation "Type C").

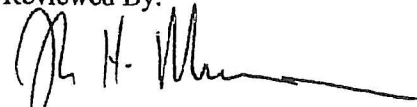
Based on the above understanding, we indicated that it was our judgment that the assembly will attain a 1-hr fire resistant rating in accordance with the Standard ANSI/UL 263 (ASTM E 119).

We trust the above answers your inquiry. However, if you should have any additional questions, please feel free to contact the writer.

Very truly yours,


MARK IZYDOREK
Lead Engineering Associate
Fire Protection Division

Reviewed By:


JOHN H. MAMMOSER
Project Engineer
Fire Protection Division

